THE BIOLOGIST

VOL. VIII, NO. 1 MAY 1926

THE BIOLOGIST

OFFICIAL PUBLICATION OF THE

PHI SIGMA SOCIETY

VOLUME VIII DENVER, COLORADO, MAY, 1926 NUMBER 1

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PHI SIGMA SOCIETY

AN ORGANIZATION DEVOTED TO THE PROMOTION OF INTEREST IN RESEARCH IN THE BIOLOGICAL SCIENCES
founded OHIO STATE UNIVERSITY, March 17, 1925.

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ANSELM M. KEEFE (Wisconsin '24), whose article appears under the title, "Why The 'M. B. L.' " has had an intimate acquaintance with Wood's Hole over several years time. He is a busy man these days and it was only at the sacrifice of his time that he was able to contribute this article. He is president of Zeta Chapter this year, which is enough to keep one man busy, and is receiving his Ph.D. in botany in June.

ROBERT C. MILLER (California '22) was formerly the editor of *The Biologist*. He is now Asst. Professor of Zoology at the University of Washington, Seattle, Washington. There is perhaps none of us just as familiar with the Friday Harbor Station as Doctor Miller. He is well qualified to present this subject.

MAURICE B. LINFORD (Wisconsin '24) is the chapter news editor up there. He is that bright looking chap who was sitting in the center of the front row at the Kansas City Convention. Of course, he was a delegate. Remember him?

WILBUR LUCE (Illinois '25) is teaching in the Zoology Department at Illinois while he continues to work for the Ph.D. degree.

LOWELL E. NOLAND (Wisconsin '20), our beloved National Vice President. His guiding strength is well known to Phi Sigma from two conventions. He is a frequent contributor to *The Biologist*.

THE BIOLOGIST

VOLUME VIII MAY, 1926 NO. 1

The Biological Engineer

(Biology in the Spray Industry)

By LIONEL E. TISDALE, Chief of Fungicide and Insecticide Division of the General Chemical Company, N. Y.

(Theta '21)

Editor's Note:

Mr. Tisdale has prepared the first article of a series appearing under the title, "*The Biological Engineer*", contributed entirely by Phi Sigma members employed in the applied fields of the biological sciences.

Very properly, credit is due Professor J. Arthur Harris, University of Minnesota, whose article, which appeared in the December number of the *Scientific Monthly* under this heading, contained a thoughtful and inspiring message to the young biologist.

It is the editor's purpose in this series to have the Biological Engineer described through the work he is doing. While to attempt a precise definition of him would be preposterous today, we may nevertheless, arrive at a fair understanding of the nature of his opportunities, the kind of investigations he is making, his methods, his problems, and his facilities, and as well an appreciation for his point of view.

THAT a biologist has entered the industrial field to apply his knowledge in research in a practical way for the sake of its interest and development is not a true indication that he has forsaken the realms of science or has been cast aside by his co-workers or superiors due to the lack of ability to carry on scientific research. Neither is it indicative that he has restricted his chances for broadminded research nor has limited himself to a very narrow field. Such suppositions have had their sway; and even though the demand for biological research has been in evidence for many years in certain industries the inducements for entering these new fields have not been very gratifying. However, the time is rapidly approaching when the demand for this type of research will be greater, the inducements will be better and the former objections to entering such profession will be a thing of past history.

As already stated, biologists have been required in certain industries for many years. In recent years, the demand has been especially seen in industries which supply certain of the needs of the farmer and fruit grower, namely; fertilizers, insecticides and fungicides. The indications are that the demand in these industries will continue to increase. We know that agricultural products are essential for the needs of man, and as the population increases there must, likewise, be an increase in the production of these products. Therefore, the agriculturalists are continually searching not only for improved methods of cultivation

and cropping, but are looking forward to the development of more economical and efficient fertilizers and materials which will prove more economical and effective in the control of the disease and insect pests encountered. They must, likewise, find more economical and effective methods for using and applying these materials.

The needs of the agriculturalists have been reflected upon the industries and to meet them, biologists are becoming more in demand by various industries. Investigators are needed who have some knowledge of plant and animal life and who are able to carry on research along lines pertaining to the particular industry. Such investigations may mean the development of new products and their applications, or finding new uses for products already being manufactured. Investigators are needed to demonstrate the use of products and to give specific recommendations regarding their uses. Also, there is a necessity for the industries to keep up to date with the research work conducted at our institutions and experiment stations throughout the country. The ability to judge these investigations and apply those of value in a way that will be of practical interest to the industry is a responsibility which rests upon the biological engineer. This type of work necessarily calls for a man with a good scientific training in fundamentals.

In general, research work conducted in connection with an industry, does not differ materially from that carried on at the various institutions and experiment stations. One must, however, keep in mind that he is working in the interest of the particular industry and his investigations must lead to its development and progress. The industry must pay, otherwise it cannot exist during any extended period. Likewise, the project or projects carried on by an investigator must pay for themselves, otherwise the investigation will be of no value to the industry. Therefore, before one begins a project, it must be thoroughly thought out from the standpoint of its practical applications, and the results to be obtained must be more or less foreseen. He must be able also, to put the applications into practice.

The limitations with regards to keeping up to date with scientific literature when connected with an industry are just what each person makes for himself. Of course, it is true with any research position, that it is for the interest of the investigator to keep up with the progress of research.

It can be seen that the biologists who enter the industrial field will not be restricted to a narrow line of research or investigation. In fact, the duties call for one who has had a broad training and the field of investigation is also very broad. The broad experience obtained in such work is of a different nature than that which can be obtained elsewhere. It would be well worth anyone's time to obtain such experience regardless of whether he intends to follow up the teaching profession or purely scientific re-

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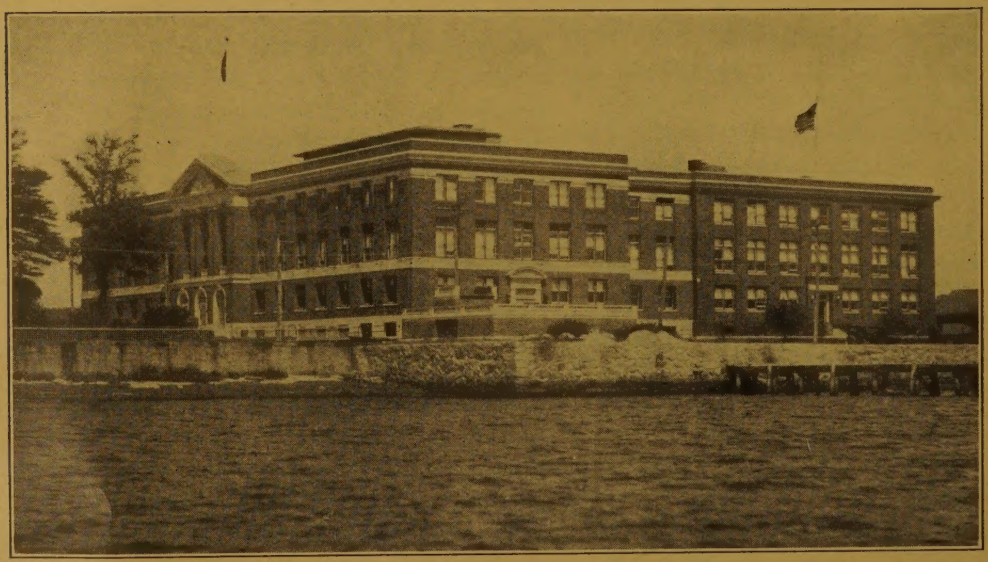

New Building of the Marine Biological Laboratory

BIOLOGICAL STATIONS

Why the "M. B. L."?

By ANSELM M. KEEFE (Zeta '24)

THE Marine Biological Laboratory at Woods Hole, Massachusetts is an institution decidedly *sui generis*. To discuss it adequately within the compass of this article is frankly impossible. It is hard to catch the spirit of any organization or institution and confine it in fleeting words. To attempt such a service for what is popularly known as the "M. B. L." is something this author is not going to try. Only those who frequent the Woods Hole Laboratory realize the depth of interest in biological science and the real appreciation for productive research such an institution can inspire.

The origin of the Marine Biological Laboratory can be traced back to the Penikese Island Laboratory of Louis Agassiz, the father of American biology. On his death the project languished but in 1888 it was finally revived on the Massachusetts mainland at Woods Hole by the Boston Society of Natural History and placed under the direction of Professor Charles Otis Whitman of Clark University. Since that day it has grown and flourished like the bay tree until today in land, buildings, sea-going craft, and research equipment it represents an outlay of at least two millions of money but potentially much more than that to the scientific and educational world at large.

In its organization this institution is owned by the members of the Marine Biological Laboratory Corporation almost all of whom are biology teachers in Universities and Colleges in the United States and Canada. These corporation members elect a rotating group of some thirty trustees to whom the executive committee in charge of the Laboratory are directly responsible. All the funds of the institution not needed for immediate use are administered by a New York City Trust Company.

The personnel of the Laboratory may be roughly divided into two groups,—those engaged in teaching and research, and those doing course work. The first are greatly in the majority. In this the Laboratory is

most unique. Most Summer Schools open their doors to a flood of students with only sufficient instructors adequate to meet their demands. At Woods Hole, to take 1924 for an example, there were only 134 students chosen from a list of almost twice as many applicants, and every course was filled to its accommodation limits. This group was taught by a corps of nineteen instructors. There were also seventy beginning investigators, mostly graduate students from the universities, whose research was under the supervision of sixteen additional professors. In addition to these there were more than a hundred biologists from America and Europe to whom all students had the privilege of free access and consultation.

The lines of research at Woods Hole fall into five broad groups; Marine Zoology, Protozoology, Botany, Embryology and Physiology. In each of these subjects a single course is given. To each of these, likewise, a special investigational staff is attached for the special benefit of those who are just beginning research proper. Taken all in all, however, the long list of investigators and instructors embraces practically every field of biologic interest. Among these biochemists, biophysicists, cytologists, ecologists, morphologists, geneticists and physiologists may be mentioned.

The material wants of all these varied lines of research are met by an extraordinarily efficient supply department which ramifies through chemical and physical store rooms, a machine shop for special apparatus, and a collecting crew with a steamer and a whole fleet of motor and row boats.

Most of the research is carried on in the main laboratory building, which consists of a large L-shaped brick and concrete structure with rooms for all varieties of special research. It also houses a library rapidly expanding to its expected capacity of a hundred thousand volumes. A large lecture hall likewise contributes to the serviceability of this main building which serves as a nucleus for the Laboratory life. Surrounding it are buildings devoted to the supply department, storage of preserved material, and the large dining hall, commonly known as "The Mess." Near by are four other buildings devoted to lecture, general laboratory and additional research rooms. Scattered about Woods Hole are some eight dormitories where a part of the professors, their families and the students are quartered. The Laboratory also owns some tracts of land parcelled out to those investigators who have joined the Woods Hole summer colony more or less permanently and built themselves summer homes to which they return year after year. In this manner many who are otherwise hampered by teaching and administrative duties during the winter months find opportunity for the research for which they have otherwise so little time.

This is the purely educational and research side of Marine Biological life. There are other sides to summer

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FRIDAY HARBOR STATION

The Puget Sound Biological Station

By Robert C. Miller (Mu '22)

THE Puget Sound Biological Station is situated on San Juan Island, Washington, near the town of Friday Harbor, which boasts 400 inhabitants and a bank, butcher shop, bakery, hardware store, garage, two or three grocery stores, and a drug store which advertises itself as, "The Farthest Northwest Pharmacy in the United States." The Station is beautifully located, on a tract of 485 acres, heavily wooded, and with over a mile of shore line. The quiet waters, numerous indentations, and various types of shore found in the vicinity combine to favor a rich and varied fauna, while the extraordinary tidal range, often as great as twelve feet in as many hours, exposes a wide beach at low tide, affording a most favorable opportunity for the study of the fauna and flora of the intertidal zone. Even the zoologist with wide experience in seaside work is astonished at the wealth of marine life to be found in the immediate vicinity of the Station, and along the shores of the numerous islands, of which there are approximately 100 in the San Juan archipelago.

The summer climate is delightful, cool and invigorating. A few rainy days may be expected in June, but there is rarely any rain from July to September. The life at the station is an outdoor life, the living quarters being 10x12 tents, on board platforms, with three-foot board walls. Included in the rent are bed springs or cots, mattresses, camp chair, etc., but bedding is not provided. Meals are provided at the station at a cost of $5.50 a week. The large dining hall will accommodate 200. The total expense, including living quarters, meals, tuition, laboratory fees, etc., is estimated at $91 for the term of nine weeks. For persons occupying research rooms the total Station fee is $50, in addition to living expenses; such persons, however, are absolved from the ordinary student fees, amounting to about $25, so that the extra expense of research workers is not very great.

The main buildings of the Station are five in number at the present time, including the commodious dining hall and living room, in an alcove of which is the library, and four laboratory buildings, each containing a large laboratory for student use, and three smaller rooms which are used as stock rooms, darkrooms, or research rooms. Ordinary microscopic and other laboratory equipment are provided, but it is best for research workers to bring their own microscopes. Those requiring special equipment for their work should write beforehand to the Director.

In addition to the opportunities for research, courses of university grade are offered in Animal Morphology, Animal Ecology, Embryology of Invertebrates, Plant Morphology, and Algae. Students are advised to register for one course only, as all work is planned on that basis. Students giving their whole time to the work may earn 13 quarter hours or 8½ semester hours of university credit during the term, which begins on Monday, June 21, and closes Friday, August 20. Full information may be obtained by writing to the Director, Professor T. C. Frye, of the University of Washington, Seattle.

To undergraduate students desiring summer work for university credit, to graduate students and to teachers of biology from inland states who desire the training and experience of a summer at the seashore, and to research workers interested in systematic, ecological, or experimental aspects of marine biology, the Puget Sound Biological Station affords an ideal location for a summer of pleasant and profitable work.

A scientist has just discovered that plants grow better if the day is prolonged with artificial light. Further investigations prove that the plant which profits most from this treatment is the *electric light plant.*

—Blue Baboon.

The Biological Engineer

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search connected with an institution of higher learning or an experiment station. Such work should be looked upon as an exceptional experience rather than a discredit to anyone for having left the purely scientific field. The industries are of as great importance as the field of scientific research, therefore, we can see the need and probably the necessity of becoming familiar with the industrial side of the various branches of biology. This can be thoroughly accomplished only by being connected with the related industry.

It is but natural that a biologist who enters a new field will be looked upon with some skepticism. However, the near future will offer many opportunities to the industrial biologist. Then, as fellows in biology, let us now offer every means to encourage, assist, and cooperate with those who undertake the tasks in this rapidly developing and extremely fruitful field for biological research.

WISCONSIN SOIL TEMPERATURE TANKS IN OPERATION

A range of soil temperature control tanks, originated at Wisconsin, for the study of behavior of soil-borne diseases in relation to soil temperature. These are wooden tanks filled with water, electrically heated and thermostated to the desired temperature, with metal cans in which plants are grown suspended in the water. This is only part of the equipment now in use at Wisconsin for the regulation of environment in the study of plant diseases.

Plant Pathology in Wisconsin

By Maurice B. Linford (Zeta '24)

PLANT Pathology at the University of Wisconsin had its beginning in 1910 with the appointment of Professor L. R. Jones as plant pathologist. In the following year a separate department of plant pathology was created in the College of Agriculture, the second such department in this country, with Professor Jones at its head. Dr. Jones, a Wisconsin man by birth and early training, finished his undergraduate work at the University of Michigan where he later took his Doctor's Degree. He came to Wisconsin from the University of Vermont where as Professor of Botany for twenty years he had already made an enviable reputation in plant pathology through his investigations of potato diseases and the bacterial soft rot of vegetables. But more significant than his scientific accomplishments are the traits of mind and character that have made him the great teacher and administrator that he is. Professor Jones has been able to draw around him a group of highly capable associates and students and to develop in them the qualifications which make for successful research and scientific leadership. His genius as a teacher and advisor, as measured in the achievements of his students and their respect for him, reserve for him a prominent place among the outstanding teachers of this country.

The Wisconsin department of plant pathology is primarily a research institution. One practical course in plant diseases and their control is given for undergraduates in agriculture, and some of the other courses are open to advanced undergraduates. Within the department, besides a general course in principles of plant pathology there are special courses covering: methods of research; fungicides; and the diseases of special groups of crops; orchard fruits, small fruits, garden crops, cereals, and forest trees. These special courses, of which the student is expected to take several, afford a survey of the important work which has been accomplished in the entire field of plant pathology. They are supplemented as desired by other work in bacteriology, mycology, botany, and related fields. The most popular minor subjects, of which only one is advised, are botany and agricultural bacteriology, although genetics, agronomy, horticulture and others are sometimes chosen. But the student is encouraged to hold to a minimum of class work and to devote a relatively large proportion of his time to research, for it is recognized that the way to prepare for in-

vestigational work is to engage in it under supervision.

The staff, aside from Professor Jones, is comprised of a group of specialists: G. W. Keitt, fruit diseases and fungicides; J. G. Dickson, field crops; J. C. Walker, garden crops; R. H. Colley, forest pathology; E. M. Gilbert, mycology; J. J. Davis, collection of parasitic fungi; R. E. Vaughan, pathology extension; and James Johnson, tobacco diseases and virus diseases of the Solanaceae. Besides these should be mentioned certain members of the U. S. Department of Agriculture working at Madison in cooperation with the experiment station who are very much a part of the department. Drs. F. R. Jones, S. P. Doolittle, H. H. McKinney, John Monteith, and Miss Helen Johann are here conducting their investigations in association with the graduate students and, quite as much as members of the staff, are always glad to give advice or even more concrete assistance to students interested in related investigations. The closest harmony between state and federal departments prevails, and thus, with the special equipment rendered available for use in the department, the effective range of contacts and of facilities for graduate students is markedly broadened.

The graduate student group is a cosmopolitan assemblage working harmoniously together under the influence of the departmental leadership. At present in the group of sixteen plant pathology majors the states of Wisconsin, Kentucky, Florida, Kansas, Utah, Montana, and New Jersey are represented besides England, Australia, Holland, Canada, Jamaica, Japan, and the Philippines. Students of former years represent almost every state of the Union and many foreign countries.

Some of the subjects of investigation now in progress in the department include various aspects of the following diseases: apple scab, fire blight, cherry leaf spot, crown gall, cabbage yellows, cabbage head rot, club root of the crucifers, storage rots of onions, bacterial disease of alfalfa, brown patch of turf, various clover diseases, wilt and "blight" of peas, bacterial blight of beans, pecan scab, aster wilt, seedling blights and seed treatment injury of cereals, various aspects of virus disease problems, and others. The most bizarre problem to come to this laboratory in years is the cactus disease study underway by Mr. Lewcock who was sent to this country by the Australian government in search of diseases of the prickly pear which may assist in combatting this pest. Introduced prickly pears are overrunning vast areas in Australia and it is hoped that some fungous or bacterial disease may be found which will assist in checking the advance of this pest or even in its eradication.

The Wisconsin department of plant pathology is admirably situated for advanced study. With a student population of over 7000, about ten per cent of whom are graduates, Wisconsin ranks as one of the great universities of the nation. This de-

partment thus enjoys contacts with strong departments in the related sciences.

Library facilities are very fine. The department maintains a working library of the more specialized plant pathological literature, and Professor Jones' personal collection of more than 5000 reprints and pamphlets is available for student use. These are supplemented by the comprehensive agricultural library, the biological library, the University General Library and the Wisconsin Historical Library. Combined, these libraries afford a degree of completeness of plant disease literature exceeded in but few cities in this country.

The department maintains an extensive herbarium of plant diseases containing numerous dried and pickled specimens of the diseases of economic plants. In addition to this there is a departmental collection of cultures of the more important plant pathogens. In the Herbarium of the botany department are to be found extensive collections of exsiccatae including not only the economic plant pathogens but many others as well. Dr. J. J. Davis, the curator, is widely known for his studies of the parasitic fungi of Wisconsin which he has collected exhaustively for years. He maintains connections with the leading mycologists of the world and has built up a collection which is of inestimable value to students whose problems take a mycological trend. Good sound advice awaits the student who goes to Dr. Davis with a taxonomic problem.

The department is housed in the Horticulture building and in a special laboratory or pathologium connected with the adjoining range of greenhouses. In the Horticulture building is the main graduate laboratory, a large room in which each of the graduate students has a desk with appropriate shelf and cupboard space. Here also are located the usual appliances and apparatus for bacteriological and botanical technique. Additional ovens, steamers and autoclaves including a large canning factory retort for soil sterilization are in the pathologium; and in the greenhouses are the famous Wisconsin soil temperature control tanks, a series of chambers for the control of air temperature and humidity, especially devised inoculation chambers, and an ever changing variety of special apparatus devised to meet temporary needs.

Madison lies in a region of diversified farming, with regions of more specialized agriculture not far distant, bringing most of the important crops of temperate North America within reach of the investigator. Students are urged to engage in summer field work either at Madison or at special field stations where conditions are most favorable. Truck diseases are studied at a summer laboratory near Racine in the Lake Shore trucking area, while orchard disease problems are investigated at temporary stations in the leading orchard districts of the state. Students are usually employed in summer either with their own or with departmental proj-

ects in a way to give them practical contact with plant diseases in the field.

Opportunities for earning at least part of one's expenses are rather good. Due to the very limited undergraduate teaching done in the department, teaching fellowships are not available, but there are a number of research assistantships and usually some industrial fellowships, university fellowships and scholarships that can be obtained by well qualified students. Openings with financial assistance for first year graduate students are not many but are often granted to individuals of promise through early application when funds are available. The right type of student usually has no trouble in getting some financial aid for a second or third year. Many students are practically self supporting once they are established here; in fact a majority are largely so.

Interested Harvard Professor Advises Society Caution

DOCTOR W. J. CROZIER from the Harvard University Laboratory of General Physiology, says: "I have a notion that there is danger, of which you are doubtless aware, in deliberately seeking to stimulate interest in biology—or indeed in anything else. The best definition of education that I know states that the function of teaching is to 'provide conditions which permit intellectual development.' *Permit* — but do not self-consciously *force.*"

Reed, on the floor of the convention, "This is a student organization and we are trying to keep it so".

A cauliflower is a cabbage head with a permanent wave.

Why the "M. B. L."?

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school life which must be cared for.

Evening lectures of a more or less popular nature are given in the main lecture hall on an average of twice a week by visiting scientists or members of the staff. Some of the courses conduct weekly seminars as well.

The social needs of the summer group are met by the "M.B.L. Club" which finds a home in the former Yacht Club building on the harbor front. The Tennis Club maintains four excellent courts and conducts an annual tourney for the Laboratory championship. Both these organizations are supported by small membership fees and an annual entertainment of unusually high class sponsored by their members.

Bathing facilities are more than adequate. With one beach to the northwest on Buzzards Bay and another a short way off to the southeast on Vineyard Sound pleasant bathing is always assured no matter from what quarter the sea breeze may blow.

When all these factors are considered separately and together there is little doubt left in the biologist's mind as to "Why the 'M. B. L.'?"

Zoology at Illinois

By Wilbur Luce (Rho '25)

THE principal aim of the Graduate School of the University of Illinois is, "the development of the power of independent work and the promotion of the spirit of research." This quotation from the catalog of the Graduate School expresses in a few terse words the spirit that pervades the graduate school of Zoology. Every effort is made to foster that spirit of independent thinking and thirst after knowledge that is the second nature of every true scientist and research worker whatever the field of his study may be. To attain this aim in the highest degree a broad knowledge of the subject matter of zoology is necessary, and every candidate for a higher degree is expected to have such a foundation on which to build.

The facilities for carrying out such a program are of the best. The research laboratories contain such a diversity of equipment that the student can attack nearly any kind of problem that he desires. The Vivarium, a thoroughly modern research laboratory, has special equipment for the study of aquatic life. This building contains also excellent systems for the automatic control of environmental factors such as temperature, humidity and light. The research laboratories are isolated as much as possible and the worker while he is within their doors is entirely free from annoyance and from the inefficiency resulting from interruption. One of the requirements for the doctor's degree is one summer's study at the seashore. This gives the student an opportunity to become acquainted with the rich and varied fauna of the sea. The department maintains an investigator's room at the Wood's Hole Marine Biological Laboratory especially for its students.

The library facilities at Illinois are excellent. The Natural History Library of 23,500 volumes contains all the important publications in the field. This is supplemented by the fine library of the State Laboratory of Natural History, which is housed in the same rooms. These libraries afford the student an opportunity to learn of the works of those who have preceded him in any line of research which he wishes to take up, and they furnish as well a chance to study and gain a knowledge of the various fields of zoology.

Many of the graduate students of the department are part time assistants, giving some of their time to instruction in the undergraduate courses and using the remainder for train-

ing themselves. As most of the graduates become teachers, this arrangement is ideal, yielding at the same time, the needed experience in teaching and the chance to pursue study and research. To first year graduate students of ability a number of scholarships of three hundred dollars are open with freedom from tuition, incidental, and laboratory fees, while to second and third year students fellowships of four hundred and five hundred dollars are available with freedom from the fees mentioned above.

In a field as broad and diverse as the subject of zoology specialization is inevitable, and for efficient and productive results, essential. Each University and research center has its special lines of activity for which it has special equipment both in men and materials. Some of the problems being undertaken at Illinois are in the fields of parasitology, animal ecology, genetics, and experimental zoology.

Past National Vice-president Lush Pays Visit to Kansas City Convention

MR. LUSH, just as interested in Phi Sigma as ever, stopped, although a busy man, to send his greetings through these columns. He is situated at the A.&M. College, in the division of Animal Husbandry, College Station, Texas.

"The Kansas City meeting was the first convention of Phi Sigma which I have been able to attend at all, and it was something of a surprise and a real pleasure to see so many enthusiastic delegates there. Owing to other engagements and a program in which I was vitally interested, I could only attend the luncheon part of the Phi Sigma program and therefore of course have only a hazy idea of the real business of the convention. However everyone at the luncheon seemed in high spirits and I will venture the guess that there was no serious conflict in the business sessions of the convention. One very gratifying impression which I carried away was that every branch of biology was represented from psychology to systematic entomology,—or to biometry, if the first comparison doesn't seem wide enough. Phi Sigma has certainly grown since the days when I was officially informed of its various doings".

A Loyal Dollar From the Orient

PROFESSOR CLAUDE RUPERT KELLOGG, Epsilon '18, is a true hearted Phi Sigma. This American zoologist and entomologist in China regularly sends his dollar to be a subscriber to *The Biologist*. That this money goes to a subscription to this magazine and not to any other more truly scientific publication which might be needed in his work out there, surely shows loyalty and interest in a cause back home. As Doctor Kellogg would have remarked, it proves our dependence upon a source which will supply us with news of our friends and our earlier associations. It is to be hoped that Mr. Kellogg still finds in our journal a medium to satisfy his fraternal interests.

Mr. Kellogg is devoted to the task of breeding better strains of silkworms for the Chinese government at Foochow, China. He has been instrumental in taking many of our native queen honeybees into the Orient.

Our Service to Science

By Lowell E. Noland (Zeta '20, Natl. V.-Pres.)

We are banded together as a national body with the particular purpose of encouraging and improving biological research, especially among the beginners in this field. A good researcher pays careful attention to the methods he uses. We, too, ought occasionally to consider carefully what we are trying to do and the way we are going about it, to see whether we may not increase our efficiency.

Perhaps the greatest value of Phi Sigma lies in the promotion of friendships among beginners in various branches of biological research, opening to them a wider horizon of contacts, saving them from a narrowness which kills. These friendships make the acquired knowledge in other fields more easily accessible because of the help and advice which friends can give. Phi Sigma helps the novice to learn early to see his work in relation to biological science as a whole.

The local chapter meetings where members discuss results with each other are most effective in stimulating new ideas and discovering sources of error while research is under way. At least half the regular meetings of every chapter ought to be of this nature. Occasional outside speakers bring a breadth of view and an inspiration that is refreshing, but their talks, I believe, are not always as fruitful in immediate, practical suggestions as the discussion informally of the research of members by their fellows.

It has never seemed to me that Phi Sigma's purpose will be much advanced by the method of offering competitive prizes to stimulate research. We are after truth, not money; and we do not care to coax into research students whose, "itch to know" is not enough to start them. Honorary awards, which do not involve the conscious pursuit of a prize, are to me less objectionable, but is it the place of a society of beginners to discriminate and give honor in such a formal way? Loan funds or gifts to help worthy workers continue their work seem much more fitting to me.

In institutions where seniors do original work and where Phi Sigma members are mostly limited to graduates, the local chapters might serve a helpful purpose by inviting in seniors from various biological departments, and discussing their research problems with them.

What does the National Council do to further the aim of Phi Sigma? (1) By holding national conventions it promotes mutual interchange of ideas

and more effective methods. (2) By holding annual scientific programs in connection with the A.A.A.S. it gives opportunity for presentation and discussion of research by sympathetic fellow workers, who desire to help not to tear down. (3) By developing THE BIOLOGIST as an organ for the publication of short articles helpful in broadening contacts, stimulating to the biological investigator, it hopes to give encouragement to the beginners, who are tackling their first real problems in research. Under the efficient leadership of the present editor of THE BIOLOGIST I foresee the rise of our national organ to a new plane of usefulness. (4) The National Council supplies an organization enabling Phi Sigma to act with the other national societies in matters that pertain to the welfare of biological investigation throughout the nation.

These are the ways in which Phi Sigma may serve and is serving! Hearts to the work, my friends!

The Treasurer's Jot and Tittle

WE are striving both as individuals and as an organization to attain as nearly as possible the ideals which we have in mind. The individual may approach fairly near his goal without giving his companions his complete confidence as to what his ideal may be, but not so with the organization striving to attain its ideal. The nearer each member understands the viewpoint of the governing influences, just so much nearer will we approach the mental perfection we set for ourselves.

Unfortunately we are obliged to deal with hard business in the course of the trip. However, I feel that Phi Sigma has gone remarkably far on slender resources. I do not know of anything more helpful we can do for a group of young students than to bring them together in the proper atmosphere and the A.A.A.S. meetings every year. Our budget was laid out on the plan of having a convention every two years, but here we are, having meetings for three consecutive years. While I am certain we will weather the financial stress, it will be hard sailing. Everything should be done to cooperate with the National Treasurer and to economize among the National offices and in each local chapter.

Study in Hygiene

Dr. to anxious parent: "Now, my dear woman, you must be very careful to sterilize everything in connection with your baby's milk, water, playthings, etc."

Fond Parent: "Yes, doctor, I will do my best to follow your instructions for the health of my darling child is more than life to me".

A few hours later the Dr's phone rang furiously.

Dr.: "Yes?"

Parent, anxiously: "Dr. I have boiled everything but the ice and the baby. What next shall I do?"

Dr.: "I think you should feed the baby."

THE BIOLOGIST

OFFICIAL PUBLICATION, PHI SIGMA SOCIETY
PUBLISHED TWICE YEARLY, IN DECEMBER AND MARCH

Editorial and Business Office
Missouri Botanical Garden, St. Louis, Mo.

Editor and Manager
EVERETT F. DAVIS

Editorial

A SAYING which has been handed down from former national president, E. W. Sink (Beta), comes to mind. If Phi Sigma ever ceases to function progressively, "Let's take 'er out behind the barn and cut 'er head off."

Liberty and freedom to interpret broadly the legislation of the centralized authority was the key note of the convention. Each chapter holds the inalienable right to proceed with the solution of their local and highly individual problems as they see fit. A prevailing spirit among the chapters to work in harmony and in friendly cooperation with the Constitution and the polity of the National Council will be the likeliest way to safeguard these rights.

Along this line there is manifested a desire to keep the society free from all details. It is the opinion of some that already there have been demands made upon the local officers in excess to those very necessary for a full discharge of their duties. If it exists, this tendency may be guarded against by several methods.

In the first place, the National Council must not expect people busy in their research and college curricula to stop many times during the year to prepare some information for them. On the other hand every local officer must be willing to accept the obligations imposed by his office. The over-loaded secretary-treasurerships have been lightened in most chapters by separating the combined duties of these two offices. A further step in this direction, one which should result in greater efficiency, is the proposed appointment of a chapter news editor.

Second, it is felt by most of the chapters that a highly developed centralized machinery would rob the

chapters of energies which can be more fruitfully spended on their campuses. It is gratifying to see that our National Council has been the first to recognize such a danger, and has wisely set a precedent to avoid it.

The Biologist, too, should never develop to the place where it becomes a burden upon the society, as it might if it were the policy to publish many scientific treatises. To be a first rate publication in this respect, would be to impose upon its members a financial tax and a multitude of responsibilities which would undoubtedly result in a burden hard to carry.

Third, our aims from year to year should be few in number, but large enough to challenge the best efforts of a society organized specifically for that purpose. Our present chief aim appeals for this reason. Burton E. Livingston Permanent Secretary of the A.A.A.S. set forth what is to be our aim, in his message of congratulation, which was given by our secretary at the morning session of the convention. He alluded to the fact that there are given to us unique opportunities for doing a world of service to the biological sciences. He believed us fully capable of developing the Junior Program idea to such a high degree within the next few years that the A.A.A.S. could very well take over the program as a junior session of that society.

The fourth method for lessening the details in the society is for each chapter to fully realize that they can and should make the effort to solve their own problems so far as they do not concern the organization as a whole.

Youth is characterized by vigorous activity and an abundance of surplus energy. Scenescence in an organism is a condition brought about through differentiation. Old age follows youth and is quite definitely known to be a state of heightened metabolic and physiological stagnation. We resemble youth in that we as yet barely recognize our potentialities. We must, however, be aware that even outside the realm of biology it is just as possible for governments and legislative bodies to become clogged by the products of their own invention, as it is for the animal or the plant to succumb to its own differentiation.

Appreciation

It is with the hope that our readers will enjoy the cuts at the head of several articles, that they have been used to liven the pages for this issue. Appreciation is due Miss Margherita Cotonio (Iota '25) who cleverly designed them.

Miss Cotonio delightfully entertained the members of the local chapter, to which she belongs, by her caricatures and place-cards which were used at the fall initiation banquet.

By illustrating *The Biologist,* she will receive the sincere appreciation of the entire society.

Prof.: "What are the habits of a wasp?"

Frosh: "Very bad, I assure you".

—Pointer

Fanny-Fern Smith (Iota '21)

Newly Created Office is Evidence of Growth and Expansion

Miss F. Fern Smith (Iota '21) is Elected to High National Office

GROWTH in Phi Sigma has been in evidence along several distinct lines. Has she not extended herself into the furthermost corners of the United States; from Maine to California, and from Florida to the Northern Dakota? Unlike the mushroom, development within has been steadily keeping pace with growth in size.

Some features indicative of an internal growth and differentiation are: the institution of an annual convention, the skeleton which supports every vital part; a central nervous system, our National Council, which through its personnel is in tune and in sympathy with every sense impression throughout the organization; a greater vascular system with its channels widened to accommodate some of our "Extra Curriculum Activities" such as the Junior Program, the National Research Council Endowment, and our services to the International Congress of Plant Sciences. And just as important to growth, are the body fluids which must bathe every part of the organism. *The Biologist* goes to every active member; a magazine for the younger scientific worker and edited by a student, it assists in the growth of the whole organization.

Few members of the society have been fortunate enough to witness and to follow these increases in dimensions from the small beginnings. Perhaps few women, if any, have come in closer contact with the working of Phi Sigma than Miss Fanny-Fern Smith of Iota chapter. Miss Smith was elected to the National Council as Assistant National Secretary at the last convention.

Her activity in the society dates from her initiation into Iota chapter, in the fall of 1921, from the Junior class at Washington University. Her ability and interest in sciences, and particularly the biological sciences were such that Phi Sigma let down the bars to admit a junior student.

At Iota chapter, Miss Smith has won for herself an enviable reputation. Among her friends there she is known as one untiring in her willingness to serve the chapter in any capacity and unceasing in her efforts to promote intergroup concordance.

Obviously because of such reasons,

she was selected as the person best fitted to fill the newly created national office. Miss Smith has the distinction and very great honor to be the first woman to represent the society nationally. It can be expected that she will carry out her larger duties just as efficiently, with the same degree of enthusiasm and precision as she has already manifested in lesser responsibilities.

Miss Smith was delegate to the Washington Convention in 1924. She has recently published a master's thesis, entitled "Pseudo-fertility in Nicotiana", which she has been invited to read before the Genetics Division at the International Congress of Plant Sciences held in Ithaca, New York, this August. Her doctorate thesis is upon physiological and cytological studies in mosaic diseases and leaf variegations in plants. She will take the Ph.D. degree this June at Washington University and the Henry Shaw Graduate School of Botany. Lindenwood College for women, St. Charles, Missouri, has been fortunate in securing her as a teacher of botany and bacteriology for next year.

Secretary Reed Receives Honor

DOCTOR REED has recently been honored with Fellowship into the A.A.A.S. He has also received a grant of $200. for research by the same scientific body. The Phi Rho Sigma medical fraternity to which he also belongs has granted Doctor Reed $100. for the same purpose. The latter is a distinct innovation on the part of the professional fraternities. This is the first grant made from the Phi Rho Sigma research fund which has been accumulating for some time.

No Co-eds For Them

Some of the chapters of Phi Sigma find it to their particular advantage to admit the ladies into their august assemblage, and in fact at banquets find them, *"custos morum"*, the guardian of their manners. One chapter, however, announced on the floor of the recent convention, in terms of no uncertainty; Hands Off! "Beta chapter is, and always has been, a chapter consisting of men only. It is our belief that the presence of the opposite sex would tend to muzzle our inclinations toward free speech, and this of course must be avoided, even at such cost".

It is apparent of course in the above rejoinder that these young men are but expressing in their fraternal relations with the fairer sex, the demand for "free-speech" along with the demands for free-air, free-rides, free-drinks, and all the other efforts mere man is making these days to rid himself of constraining bonds and to assert that "mysterious and inexplicable spontaneity of the Self as possessed of the so-called *free* will".

But Beta chapter is not entirely alone in her opinions, for Epsilon, Zeta and Nu chapters hold similar grudges against the accused college flapper with the dottle grin and the sleek boyish bob.

A. E. Men.

The Inheritance of Acquired Chapters of Phi Sigma

By Erwin H. Stewart (Epsilon '17) and Clarence E. Kobuski (Iota '24)

THE following sketch is incomplete and doubtless incorrect in many ways, and additions and corrections are earnestly requested in order that we may have a corrected history before the memory of those living fails. Send any data you may have to the Editor of *The Biologist*, for the, "Tripotage".

Alpha, Beta and Epsilon chapters seem to have evolved and arrived at a fairly mature stage of development entirely independent and in ignorance of each others existence until Alpha took steps to expand, an effort at expansion having been previously made by Epsilon without success.

Through Mr. P. B. Wiltberger Alpha became the mother of Delta chapter at Maine.

Though the efforts of Mr. Hambleton Alpha became the near mother at least of Zeta chapter at Wisconsin.

Through Mr. Fox Alpha became the mother of Eta chapter at Akron.

Through Mr. Armstrong Zeta became the mother of Iota Chapter at Washington University, Iota thus being the granddaughter of Alpha.

Through Mr. C. I. Reed Alpha became the mother of Kappa at Kansas.

Through Mr. Cunningham Zeta became the mother of Tau Chapter at Duke, thus giving Alpha another granddaughter.

It seems that Mu chapter was due in part at least to the influence of Zeta and Pi is the daughter of Mu.

Sigma seems to have double or triple ancestry pointing to Alpha and Zeta.

The descent of Nu and Theta and Omicron Chapters are uncertain to the writer.

Through Mr. Owen, Epsilon became the mother of Lambda Chapter and in turn through Mr. Parmerlee and Mr. Moore Lambda became the mother respectively of Xi chapter and Rho chapter giving Epsilon two granddaughters.

In summing up the growth of the Society we find that most of the chapters are due to the activity of the alumni of two of the oldest chapters, Alpha and Epsilon with Alpha leading due to the able support of Zeta.

Thus directly or indirectly Alpha was responsible for the founding of Zeta, Eta, Kappa, Delta, Mu, Tau, Pi, Iota, and Sigma Chapters.

Epsilon being responsible for Lambda, Xi, and Rho Chapters.

Beta seems to be childless unless she can claim Theta which seems doubtful.

ALPHA

I { Alpha ♀ / Wiltberger ♂ } Delta

II { Alpha ♀ / Fox ♂ } Eta

III { Alpha ♀ / Hambleton ♂ } VI { Zeta ☿ / Cunningham ♂ } Tau

VII { Zeta ☿ / Armstrong ♂ } Iota

VIII { Zeta ☿ / ? ♂ } IX { Mu ♀ / ? ♂ } Pi

IV { Alpha ♀ / Zeta ☿ } Sigma

V { Alpha ♀ / Reed ♂ } Kappa

EPSILON

X { Epsilon ♀ / Owen ♂ } XI { Lambda ♀ / Moore ♂ } Rho

XII { Lambda ♀ / Parmerlee ♂ } Xi

BETA

XIII Beta—sterile (at least, so far)
XIV *de novo* Nu, Theta, Omicron.

SUMMARY

1. Paleontological evidence shows the group PHI SIGMA to have evolved through three distinct prehistoric lines of development, namely the Alpha, Beta and Epsilon lines.

2. Of these three lines, the line Alpha (now extinct) seems to have possessed the greatest virulence; eight distinct types having evolved with Alpha playing the role of maternal ancestor.

3. Zeta, an F_1 progeny of Alpha, affords unexpected difficulty in that, both maleness and femaleness are present. Two crosses were had in which the influence was maternal, while in a backcross with Alpha, producing Sigma, the influence was paternal.

4. The crosses VIII and IX seem to possess unknown influences, in both cases the male parent being doubtful.

5. The line Epsilon, although not nearly as virulent as Alpha, has produced two distinct F_1 generations each of which in turn have produced a single F_2 individual.

6. The line Beta, to date, has not produced any progeny. This is probably due to the fact that to the knowledge of the writer no attempts at crossing have been made.

7. Three types, Nu, Theta, and Omicron have arisen *de novo.*

Evolutionist Urges Liberal Thinking

Believes Biologists Contribute Most to This End

In a recent letter to *The Biologist,* Doctor Maynard M. Metcalf, writing from Rio de Janeiro, gave it as his opinion that we as individuals are all too prone to think in terms of the immediate. "Whether in the problems of the evolution of organisms, of the earth, or of the universe," he says, "vast stretches of time are involved, which it is beyond the power of the human mind to grasp."

"So in all these evolutionary problems we ignore time, for the most part, and deal with phenomena and the sequence of phenomena, finding apparently principles (habits of nature) that march to their orderly fulfillment. As biologists our thoughts focus on these sequence habits, these principles, and as a result we are apt to form the habit of thinking in the large, getting breadth of vision".

"Details of knowledge are accumulating to such a burdensome, such a frightful degree, that, as individuals, we are in great danger of being buried beneath this mass of detail, of becoming over-specialized, of being petty in our thinking. The evolutionary sciences; astronomy, geology, biology (including paleontology) seem to me to give the best antidote to this tendency to bewilderment in the midst of the great mass of confusingly interwoven detail."

"Success, therefore, to Phi Sigma in its encouragement of students in the study of the science which has been chief in emphasizing evolution."

—Maynard M. Metcalf.

The Completed Menu

Vigilant Officer: "Sam, what have you got in that grip?"

Sam: "Ten pounds of sugar for my coffee."

Vigilant Officer: "Sam, what have you got in that other grip?"

Sam: "Ten pounds of sugar for my tea."

Vigilant Officer (drawing blackjack): "Well, Sam, here's a lump for your cocoa."—*Punch Bowl.*

The Kansas City Convention of Phi Sigma

One Big Day in Which Fraternalism in Biology Reigns

CHARACTERIZED as the most successful attempt yet made to bring the representatives of the society together was the convention where the delegates and visiting members met at the **Hotel Baltimore, Kansas City, Mo., December 28,** with the Christmas Meetings of the **American Association for the Advancement of Science.**

Most of the delegates arrived in Kansas City during the coldest spell of the year, signed up at the convention register, and were all in their places, when President Cutler rapped for order at 9 o'clock. The business session continued without interruption until 12 o'clock, when the Phi Sigma luncheon was announced.

THE LUNCHEON

More than thirty persons gathered about a long table centered in the middle of an attractive club room of the hotel, to pause for a time, in the course of a busy day, to enjoy one another's society while eating. It was one of those events which no one can hardly fail to mention repeatedly, when greeting a member on such stated occasions for the second time. The possibilities for increasing the size and importance of this event are many indeed. Former Vice President Jay L. Lush was among those present.

REPORTS OF THE OFFICERS AND DELEGATES HEARD

The entire morning and the major portion of the afternoon session was devoted to the business of the society. The reports from the Officers of the National Council were given in brief summaries of the year's work. Most of the time was utilized by the chapter delegates who freely voiced chap-

ter sentiment and local problems. It was made clear that the problems confronting the chapters were singularly diversified. The chapters are performing various functions upon the college campuses. Some of the chapters are strictly limiting themselves to scientific meetings, others are combining social activities with the scientific. In some of them undergraduate students make up the majority of the active members, while others, may entirely compose a graduate group. Men and women may be represented in the chapters from the exclusion of one sex to the exclusion of the other. Local dues range all the way from nothing at the University of California to the great figure of $15.00 at Nebraska.

It becomes an impossible task therefore, to legislate away the problems for each group. As one chapter delegate has well written, "The Convention was not as important in the things that it actually did in the way of legislation as it was through the recognition of the proper relation to be maintained between the national body and the local chapters".

PETITIONERS AT DUKE AND NEW HAMPSHIRE WIN

Charters were granted to the petitioning societies at Duke University, Durham, N. C., and to Phi Gamma Fraternity, Univ. of New Hampshire, Durham, New Hampshire. The biology club, Phi Epsilon, at Miami University, Oxford, Ohio, sent a petition which was read before the Convention but was carried over without action, pending further investigation by the society. The petition from New Hampshire was received with considerable favor because of the splendid manner in which it was gotten together. Letters of inquiry from various other parts of the country have been received.

It was the consensus of opinions that the present ritual is lacking in the dignity and simplicity which is necessary to make it impressive to the average adult. A. M. Keefe, president of Zeta chapter was appointed chairman of a committee to revise the ritual.

Treasurer Stewart, advised in his report, that it would be necessary to use some of the surplus from *The Biologist* fund to meet the general expenses of the society at the next convention.

National Vice President Noland was appointed to work with Editor Davis in determining the future policy of *The Biologist*. A vote of confidence was given to them to proceed with the work as they saw fit. It is agreed that at the present time at least *The Biologist* will not attempt to publish scientific manuscript such as preliminary reports and abstracts. The Editor pointed to the fact that neither financially nor editorially are we now in a position to make a successful entry into the field with other scientific journals.

Secretary Reed is undertaking a survey of the facilities for biological research among the institutions where chapters of the society are located.

Such statistics are necessary, since they point the way to National Research Council Endowment for our society. Doctor Reed asks that every chapter cooperate in filling out the blanks in detail when they are submitted to the chapters.

Miss F. Fern Smith of St. Louis, has been appointed as Assistant National Secretary. She will handle all the routine correspondence from the National Council to the chapters. This is indeed a responsible position which is bound to grow in importance as Phi Sigma continues to develop. Miss Smith is to be congratulated and Phi Sigma is fortunate to have such a wide awake, energetic and competent worker in the lead.

It was made clear at the Convention, earlier reports to the contrary, that Phi Sigma is ranked as an *affiliated* society with The American Association for the Advancement of Science.

AN AFTERNOON PROGRAM OF SCIENTIFIC PAPERS

The institution of a program of scientific papers read by young members of the society at the afterdinner session marks what may well prove to be, a distinctive feature of our society. It will not be said by anyone who was present at this splendid meeting that this Convention has initiated an event which should not continue to be an annual program in connection with the other meetings of the A.A.A.S. The papers were all well prepared. From the interest shown in the discussions which followed, one can feel, that those who gave papers returned to their work with an inspiration gained which more than repaid for the efforts involved. Once started, there will be very little necessity for searching out a program for this coming convention. The applicants should more than exceed the opportunities that are available. Members of the National Council were well pleased with the degree of enthusiasm displayed by the delegates for a continuance of this performance.

DELEGATES IN ATTENDANCE

Beta	C. O. Erlanson
Delta	Wilhelmina F. Dunning
Epsilon	Hugo M. Krueger
Zeta	Maurice B. Linford
Eta	not in attendance
Theta	C. T. Huffman
Iota	Laliah T. Curry
Kappa	S. T. Brooks
Lambda	Anne Maclay
Mu	L. J. H. Teakle
Nu	H. H. Stout
Xi	John Cameron
Omicron	Ralph Finkle
Pi	W. B. Baker
Rho	Morris Steggarda
Sigma	Marsten Bates

PHI SIGMA MEMBERS PRESENT

C. I. Reed	(Alpha)
Carl D. La Rue	(Beta)
Ira E. Cutler	(Epsilon)
T. R. Garth	(Epsilon)
G. B. Johnson	(Epsilon)
E. H. Stewart	(Epsilon)
A. M. Keefe	(Zeta)
John N. Lowe	(Zeta)
Jay L. Lush	(Zeta)
L. E. Noland	(Zeta)
E. C. Tims	(Zeta)
G. F. Weber	(Zeta)
Elva P. Miller	(Iota)
Bertha L. Uhlemyer	(Iota)
F. Fern Smith	(Iota)
Selden R. Warner	(Iota)
Mrs. C. I. Reed	(Kappa)
Everett F. Davis	(Mu)
George W. Martin	(Mu)

Focusing the Convention High Lights

Impressions of the Convention

DELEGATES have been asked to give a few brief statements of their impressions formed at the Convention. Their responses have typically favored the continuance of a Junior Scientific Program with the yearly meetings. Quite generally, too, these letters give ample evidence for the belief that all who may have attended the Convention have gone away with an inspiration which comes only by associating with the friendly personalities above us.

"The Kansas City Convention of Phi Sigma was a decided success which should be reflected in increased chapter activities during the year. It should be the aim of every member of Phi Sigma to represent their chapter at the National Convention. It served vitally to bind us together as a national organization and permitted the free exchange of views which is wholesome in any organization. The convention served especially to clear up chapter problems and uncertainties and to strengthen a unified effort for the advancement of Phi Sigma.

"To me, one of the most significant features of the convention was the refusal of the group to legislate for the detailed control of chapter activities and policy. While all have a common goal our chapters are highly individualistic, and properly so. With each chapter facing its own peculiar problems it is encouraging for the national chapter to allow the expression of complete individuality. Phi Sigma is growing both in size and solidarity, and the Kansas City Convention helped both to stimulate and direct the growth in proper channels. I feel that the National Council is to be congratulated on the way the convention was handled."—M. B. LINFORD, (Zeta).

"The Second National Convention of Phi Sigma undoubtedly left an abiding impression on all who were privileged to attend it. Those who went through the confusion and the turmoil of the first convention,—and several of them came back to the second,—could not help feel that in Washington they built better than they knew, so easily and naturally did this group of delegates get to work. Another such national gathering should see Phi Sigma firmly and solidly established for all time."—REV. A. M. KEEFE, (Pres. Zeta Chapter).

"I feel that the promotion of the Junior Program is one of the best things that Phi Sigma has ever done. It is giving the young people who are interested in research encouragement

to go on with their problems, and the self satisfaction which comes by accomplishing something worthwhile. I hope that it will be well attended at the convention in Philadelphia."—WILHELMINA F. DUNNING, (Delta).

"The sponsoring of scientific papers in the afternoon meetings opens up new possibilities for the younger scientist. In so doing it is truly promoting interest in research in the biological sciences."—S. T. BROOKS, (Kappa).

"The number of papers delivered should be judiciously limited and each paper should be of a general nature bringing out principles involved rather than technical details, of interest only to specialists."—L. J. H. TEAKLE, (Mu).

"Perhaps the most lasting impression which I received is that made by the members of the National Council. I wish that every member of Phi Sigma could meet these men whose serious purpose it is to direct the affairs of the organization for the best interests of every chapter and every individual. It is through wholehearted cooperation with these men, and those of the same calibre who will succeed them, that Phi Sigma will grow and bear fruit."—ANNE MACLAY, (Lambda).

Perhaps the most important thing accomplished by the convention was the strengthening of the spirit of cooperation of chapters with each other and with the National Council, due to a better understanding of our common problems and the way in which they relate to local conditions. I enjoyed very much the short scientific program at the end of the business session. I feel confident that a field of real usefulness lies ahead of us in developing this outlet for scientific work.—LOWELL E. NOLAND, National Vice-President.

It has again been my pleasure and pride to witness a most remarkable gathering. Just as last year a group of young people, intensely in earnest and each with his own set of problems and the interests of his chapter at heart met together to consider matters which some of their more blasé colleagues might be disposed to consider "beyond their years and experience", and yet there was throughout all deliberations a most remarkable absence of personal rancor and a most wholesome spirit of compromise and cooperation.

The registration at headquarters, considering the total membership was very encouraging, especially in view of the fact that the greater majority of registrants are not older members who have been elected as faculty members at some time. And yet I saw personally more than half as many more whom I knew to be members who did not, for some reason, register at all. It is to be hoped that in future we can get a still greater registration.

We also had a considerably larger attendance at the luncheon, doubtless due to the fact that there was better publicity. This feature should also be enlarged in future.

(Continued to page 33)

Secretary's Report

New Chapters

On January 3, 1925, Dr. Cullen formally installed Pi Chapter of Phi Sigma in Emory University. The Secretary, on March 28, 1925, personally installed Rho Chapter in the University of Illinois. Sigma Chapter was installed on December 4, 1925, in the University of Florida by Dr. R. C. Rhodes of Emory University, delegated thereto by the President. It is urged that every chapter impress upon alumni going to positions in other schools the importance of making a definite effort to get new chapters under way.

Association with A.A.A.S.

Formal association with the American Association for the Advancement of Science.

As a result of correspondence with the Permanent Secretary of the Association, Dr. Burton E. Livingston, a formal application for affiliation was submitted to his office and was acted upon by the Council at the autumn meeting. Contrary to expectation and hope, however, association and not affiliation was formally granted. This action was based on the matter of classification and a desire to keep the Council from growing any larger, since affiliation only carries with it the right to representation on the Council. The Council gives definite assurance that this action is in no wise to be considered a reflection on the merit of Phi Sigma but is wholly a matter of classification and does not preclude the possibility of affiliation at a later date if developments within Phi Sigma seem to warrant a reclassification.

Training of New Officers

It is urged that the Society give careful consideration to the problem of training new material from which national officers may be selected.

Status of Membership

From time to time there have come to the Secretary's office communications from ambitious faculty members in certain institutions which indicate a desire to use Phi Sigma for selfish ends. No surer sign of progress could be found since it means that the organization has become of sufficient power and importance to be of value to certain unscrupulous persons. At the same time this development represents a definite

menace which must be carefully guarded against. With due respect to all my colleagues who faithfully serve their institutions, the viewpoint of the faculty member is necessarily different from that of the student. Just as surely as the active membership as represented by the students fails to assume responsibility in carrying on the development of the organization, each chapter will eventually come under faculty control and its usefulness will to a large extent be lost. There are already several representatives of this type of organization and Phi Sigma would thus merely duplicate other efforts. The remedy lies in more and more active assumption of serious responsibility by the student membership. It may even be possible at times to have national officers chosen from active membership.

While ordinarily chapters will find it advisable and desirable to accept, or at least consider recommendations from department heads in selecting new members, it should be clearly understood that no chapter is obligated to this course and the faculties of departments should clearly understand and recognize this principle.

Cooperation with National Officers

It is neither the desire nor the intent that the officers shall take any part in the conduct of affairs within the chapters any further than is necessary for efficient operation and progress. Each chapter must assume and bear its local problems so far as possible. But there are certain relations for which the chapter secretary is chiefly responsible that must be maintained if the organization is to function at all as a national organization. These have to do with the prompt reporting to both the Secretary and Treasurer of all obligations provided for in the Constitution, by Council action or by special instructions from time to time issued by the Council.

It therefore becomes necessary to urge again that the chapters make careful selection of officers and in addition see to it that officers function properly. If they fail to do so, especially the Secretary, then the Chapter should replace them. No more serious handicap is met with in the Secretary's office than the Chapter Secretary who will not take seriously the duties of that office.

Future Developments

As Phi Sigma grows in size and importance the duties of National Secretary will become very heavy. If the present rate of progress continues it is apparent that it will soon be necessary to provide compensation for the incumbent of that office. Many details now falling upon the Treasurer could then be shifted to the Secretary so that it will not be necessary to compensate both officers. Such compensation will necessarily be limited but it will render the problem of securing qualified

persons for this office much less acute.

Enlargement of the Council

As the Society grows and becomes more generally distributed throughout the country it will be of advantage to have one or more additional councillors so placed as to be readily accessible to certain chapters. The problem of visitation of chapters by national officers would thus be partially taken care of.

Employment Bureau

There continues to appear evidence that such a development would be a very desirable addition to our activities. Future conventions should take the problem under consideration.

Directory

There are frequent demands on the Secretary's office which can be met only by an up to date classified geographical directory.

Total Membership

At the time of application for affiliation it was found that the total membership included 1546 names after deducting duplications. Of these a comparatively small percentage are now members of the American Association for the Advancement of Science. When it is recalled that this is one of the largest and most influential scientific organizations in the world the desirability of becoming members of the Association should at once be apparent to all members of Phi Sigma.

A Maine Biological Station

Quite popular among the students of the University of Maine is the Bar Harbor Marine Biological Station. This institution has afforded several students from the Botany department of the University opportunity to do work of an investigational nature during the summer months.

Focusing the Convention High Lights

(Continued from page 30)

While our scientific program was not large I consider the initial effort a decided success in that the idea has, I believe, been demonstrated to be a distinctly valuable and useful development. It did more to attract favorable consideration than anything we could have done.

All the discouragement, all the petty irritations, all the disappointments of my years of service in the capacity of an officer of Phi Sigma fade into insignificance as I sit again before the group as I saw it and realize the fruition of developments undertaken with fear and uncertainty since Phi Sigma came into existence. — C. I. Reed, National Secretary.

Constitution Specifies Qualifications for Membership

PHI SIGMA members will again read the following clause adopted at the Washington Convention, 1925.

The provisions of the constitution specifying specialization in biological sciences as a qualification for membership shall be interpreted to include the following designated scientific departments:

Agriculture
(X) Agricultural chemistry
Agronomy
Anatomy
Animal husbandry
Anthropology
Apiculture
Bacteriology
Biology
(X) Biochemistry
(X) Biophysics
Botany
Dairying
(X) Dietetics
(X) Dental sciences
Embryology
Entomology
(X) Eugenics
(X) Field crops
(X) Forestry
(X) Geology
Genetics
Histology
(X) Home economics
Horticulture
Hygiene
Immunology
(X) Medical sciences
(X) Nutrition
Ornithology
(X) Paleontology
Pathology
Pharmaceutical sciences
Pharmacology
Plant chemistry
Plant pathology
Plant physiology
Physiology
(X) Psychology
Soils
(X) Veterinary sciences
Zoology

It shall be understood that in the subjects designated (X) only those persons engaged in specifically biological problems shall be eligible for membership in Phi Sigma.

Zeta Selects Chapter Speakers

Probably the plan for selecting good speakers which Zeta chapter uses will appeal to some as a method worthy of adoption. This chapter has made out a list of the leading research workers in the various biological fields. The list is submitted to the chapter membership for a vote to select the men most desired as speakers. The response has been excellent, and as a result some of the very deans of biological science have been chosen.

Report of the Editor Upon The Biologist

The Magazine in Relation With Other Fraternity Problems

THE BIOLOGIST should be a written expression of this society—a chart of our future policies—a record of achievement—a living advertisement of the spirit and character of the organization behind it.

The very foundation and future progress of this society is intimately bound up with the success of *The Biologist*. We have over 1000 alumni and scarcely any of them read this magazine. Which means that such phrases as A.A.A.S. affiliation, Biologists Day, National Research Council Endowment, and Junior Programs never reach their ears. These projects are as empty words to them. *The society magazine should be, I believe, the means of educating the alumni upon all such great aims.* Many of the pressing problems that confront this assembly and the National Council would be solving themselves if we were keeping ourselves properly before our alumni.

IMMEDIATE CHANGES MUST BE MADE

During the twelve months of his incumbency, the editor has been impressed mainly with three things:

1. The great responsibilities which the magazine has, makes it necessary to consider a very definite policy for the future.

2. Need for revising our system of financing *The Biologist* is an urgent necessity at present.

3. Lack of efficiency in the handling of the chapter and alumni news is a present handicap, preventing progress.

It will be remembered that the matter of the future policy of *The Biologist* came up at the Washington convention. It was gathered from a consensus of opinions expressed there that *The Biologist* should be made more or less a scientific journal, including both original papers and abstracts in the alternate issues. Acting upon this advice the editor drew up a plan based upon these points and submitted it to the National Council in the form of a series of recommendations. The question was not settled and was left open for debate at this convention.

The editor holds the opinion, however, that it would be advisable to avoid entering the scientific fields with other journals which are publishing either original papers of research or abstracts.

There is the open field of publishing research of a preliminary character, i. e., research in process of com-

pletion, into which we might specialize with a moderate degree of success; but such a venture has many pitfalls for us, because of the lack of adequate finances and editorial services.

Expansion otherwise has recently taken on pretty definite shape. The editor would indorse a policy which will permit the contents of *The Biologist* along such lines as these:

1. Semi-scientific articles including:
   Descriptions of new apparatus, methods, processes, etc.
   Short articles upon well established biological theories and facts, written by Phi Sigma members who are capable of handling the subjects well.
   Short articles on the practical and applied phases of biology. Written by the members employed in the industries.
2. Featuring our marine and fresh-water biological stations.
3. Featuring each chapter.

Regarding other changes to be made which have to do with its future, are these:

1. Increase in size. This seems necessary in order to accommodate increasing copy and to make the magazine more attractive, editorially.
   Recommended size; 6⅝"x9½".
   Present size; 5¼"x8¼".
2. An illustrator to liven the pages.
3. More cuts should be run in.

Regarding our system of financing *The Biologist*, the following means have been suggested:

1. Increased advertising:
   The Biologist should be made an attractive medium for advertising. Mr. Emery Ranker, Washington University has been persuaded that that proposition looked attractive from the standpoint of the society. He will care for all advertising upon a commission basis and hopes to build up this section of the Journal.
   We hope to feature the advertising for the benefit of assistances and heads of research laboratories.
2. Increasing the subscription list:
   If we conduct a campaign for new subscribers it must be set in motion by the chapters. It has been proved that the only successful way is by personal interviews. Letters are little more than useless, and articles in *The Biologist* are no better.
3. Subscription rates:
   It is recommended that the convention set the following rates:

1 year subscription	$ 1.00
3 years	2.50
5 years	4.00
10 years	7.00
Life	10.00

   and pass a by-law to the effect, that the proceeds from said subscriptions be placed in a reserve fund which is to accumulate and be invested for the rainy days.

INCREASED EFFICIENCY IN THE HANDLING OF CHAPTER AND ALUMNI NEWS:

1. Chapter response, to the national editor, is indeed a serious and important matter. The manner in which a few of the chapters have responded to every request made by the editor this year has been gratifying indeed. Others, however, have been so delinquent with their materials that they were of little or no use. Every chapter must see that their items for *The Biologist* are in, on time, and typed to meet the approval of the national editor. Many reports have come in typed single space, or, as bad, in ink or pencil. In such cases all must be typed again, at considerable expense and loss of time. Such facts are to be regretted and measures should be taken to avoid a repetition of the same situation year after year.

CHAPTER EDITORS

2. The editor endorses the proposal to require each chapter to appoint a chapter news editor, alone upon his or her special ability and degree of interest shown.

Duties:

The duties of the office shall be about as follows:

(a) Securing the desired copy for *The Biologist* and editing it in accordance to the rules laid down recently by the National Editor.

(b) Publishing a single sheet, (news bulletin) to be folded and mailed in an ordinary envelope to the alumni.

Best size recommended from experience to be 5⅝"x8⅝".
Cost is very small, approx. $6.00, twice yearly between issues of *The Biologist*.

Purpose; to keep the alumni informed about chapter activities, research, etc.

Whether a chapter publishes such a bulletin is optional, but they are recommended to do so by the National Council and the National Editor.

(c) Mailing-list prepared for the National Editor.

(d) Securing subscriptions to *The Biologist*.

PERMANENT MAGAZINE COMMITTEE

3. The editor recommends, that the Constitution be amended to extend the duties of the Vice-president to include; permanent chairmanship to a Magazine Committee. He will represent *The Biologist* on the National Council and will give aid to the National Editor on any subject which concerns the policies and welfare of the magazine.

Respectfully submitted before the convention, 1925.

EVERETT F. DAVIS,
National Editor.

National Officers Seek Closer Contact with Chapters and Universities

That the national officers are anxious for closer contact with University administrative authorities, to the end that chapters failing to understand or to live up to the national ideals of fraternities may be helped by suggestion and friendly counsel, was brought out in a questionnaire recently sent to one hundred officers of national fraternities. Mr. H. E. Stone, Dean of Men, West Virginia University, prepared a questionnaire covering the entire fraternity problem, and in his lengthy report he devoted three typewritten pages to the methods and purposes which fraternities may have in keeping in touch with local chapter problems.

It is to this end that many fraternities maintain traveling secretaries who spend from one to two weeks with each chapter. On these visits conferences with the fraternity members, the president of the university, faculty members of the fraternity, academic deans and the dean of men are held. The aim of these visits as stated by one national officer is: "To stimulate scholarship, morale, sound finances, chapter activities of all kinds; to keep up the organization within the chapter, ascertain and report on the conditions and to inculcate the traditions and spirit of the fraternity; also to give personal counsel to individuals when sought or needed."

ETA

By Kathryn Teeple

ETA Chapter held their spring initiation March 10 at Spindler's Inn. Dr. Amon Plowman, head of our Biology Department, was the principal speaker of the evening. Those initiated included: *Harold Cassidy, William Pittinger, Thelma Litsinger, Esther Stepfeild, Evelyn Burns, Clarence Witzberger, and Carl Figenscher.* They are all very interested in original work and will be a benefit to the organization.

At the meeting of March 24, Mr. Cassidy read a preliminary report on a research problem which he has in progress. The subject was "The use of black agar as a culture media." Mr. Witzberger read a paper entitled "Cultivation of tissue in vitro."

Miss Stepfeild, another of our initiates, spent last year in the pathology department of Cleveland City Hospital.

Mr. Rolland Fox, the director of the departments' bacteriological laboratory, has several research problems in progress. Among them are: bacteriology of goiter; pleomorphism and and pathogenicity of diphtheroids; Cuyahoga Valley Survey 1924, and Morphology and Cultivation of Gonococus. The last problem is in collaboration with H. J. Gordon, of the United States Public Health Service.

Dr. Walter C. Kraatz, who was a former member of Zeta chapter and is at the present time assistant professor of Zoology in the University, is starting work on certain phases of aquatic biology of Portage Lakes, near Akron, Ohio.

ALUMNI PERSONALS

Wilbur Robart '21 and Arno Towne '22 are attending Jefferson Medical School. Mr. Towne is specializing in surgery.

Everett Irish '23 is attending Western Reserve Medical School.

Harold Groom '25 is attending Northwestern Medical School.

Natalie Limbach '24 is technician in charge of the laboratory of the Children's Hospital, Akron, Ohio.

Dr. John Buys is professor of Zoology at the University of St. Lawrence, Canton, N. Y.

Burton Sours is attending Ohio State Medical School.

EPSILON

Southwestern Division of A.A.A.S. Hear Papers Read by Six Epsilon Men

By H. B. Roberts

At the seventh annual meeting of the Southwestern Division of the American Association for the Advancement of Science Epsilon Chapter was represented by six papers. Dr. E. B. Renaud was Chairman of the Social Science Section and Henry B. Roberts secretary. Dr. Renaud gave the Chairman's address on, "Palaeolithic art in western Europe," and a second paper on "Reconstructions of Prehistoric Man." Papers were sent by Dr. Thomas R. Garth, Mr. Jean Allard Jeancon and Henry B. Roberts.

The meetings this year of Epsilon Chapter have been held every two weeks and the speaker on each occasion has been an outstanding man in some field of Biological research. It was aim of the Chapter this year to acquaint the members with the leading men in Denver and give them a chance to come in closer contact with the research problems being worked on in Denver.

The Chapter is holding its own in the various research problems of the members. Dr. R. G. Gustavson and Mr. Hugo Krueger are working on the, "Isolation and purification of the female sex hormone." Dr. Ira Cutler is continuing his work on, "Reptilian Fowls" and Professor Humphrey G. Owen is working on, "Embrological Studies on Diemyctylus." Mr. A. M. Bailey is continuing his studies of Alaskan Birds and Mr. Donald Spencer is making a study of the rodents of the Boreal Zones.

Four members of the Chapter will graduate this year, Donald Spencer and Henry B. Roberts will receive their A. B. degrees and Hugo Krueger and Albert Hozlman their M.A. degrees.

TAU

Duke University Scene of Beautiful Installation Ceremony

By Alice Herman

Early in February, 1926, the members of the Biology Club of Duke University were overjoyed to hear that their petition for a Phi Sigma charter had been granted. Immediately we sent an announcement to both college and city papers. The campus buzzed with talk of the new Phi Sigma Society, the first national professional society on the campus.

We had quite an exciting time getting everything ready for the installation service. Dr. Robert C. Rhodes of Emory University installed Tau chapter at Duke University at eight o'clock on the night of March the fourth. After the installation service which was held in the Memorial parlor at Southgate we had a banquet at the Washington Duke Hotel.

The fun we had at the banquet was an illustration of the comradeship of true Fellows in Science. The banquet hall was decorated in yellow, green

and white, the colors of Phi Sigma. Place cards, flowers, and all decorations symbolized Phi Sigma, both in color and in meaning. Each of the newly initiated charter members of Tau Chapter was proudly wearing the colors that had been pinned on after Dr. Rhodes' inspiring and impressive talk, and the installation and initiation which followed.

At the banquet we enjoyed talks by Dr. W. H. Wannamaker, Dean of the University, Miss Alice M. Baldwin, Dean of Women, Dr. Bert Cunningham, a member of Beta Chapter, now head of the Biology Department, Mr. Leslie S. Thompson, President of Tau Chapter, and Dr. Robert C. Rhodes of Emory University. These speakers each made a response after Dr. Hugo L. Blomquist, toastmaster, had made the address of welcome.

There are twenty-one members of Tau Chapter. Dr. Bert Cunningham, Dr. H. L. Blomquist, Mr. J. L. Wierda and Mr. N. F. Wilkerson are the faculty members, and the active members are: J. B. Baynes, E. W. Britt, N. B. Buffaloe, Nola Jane Gentry, L. T. Heffner, Alice P. Herman, G. W. Holmes, Frances Holmes, Maude Hunter, Louis E. Garrett, S. S. Jenkins, Voris A. Matheny, W. M. Matheson, Edith Rigsbee, Verdie E. Snyder, L. S. Thompson, and Dorothy Wilson.

The officers are: L. S. Thompson, President; L. E. Garrett, Vice-President; Alice Herman, Secretary; and G. W. Holmes, Treasurer.

We have decided on the first Monday of each month for our regular meeting and our plans for the success of Phi Sigma are many. We wish to thank the chapters that sent us, the baby chapter of Phi Sigma, greetings and congratulations at the time Tau was installed here. A deep feeling of sincere desire to be of mutual aid to all of the older chapters of the Society, and for them to help us in every way pervades the thoughts of each of us here at the Duke University Chapter. We are proud of our organization here and we hope that Phi Sigma will be proud of us.

PI

New Chapter is Out for Research

By V. E. Brown

PI is already out to establish a reputation as a wide awake and peppy chapter, which in spite of its extreme youth is able to write as follows:

"All of our active members are at present graduate students and engaged in active research work."

"Clinton Baker, has been working on different and possible invertebrate hosts of Trypanosoma lewesii.

"A comparison of the embryonic hearts of various common vertebrates, is a subject which has been attacked by K. A. Bell.

"Our president, J. B. Mitchell Jr. is continuing his work on the cycle of the Chytridiaeean parasites of different protozoa. He has already reported the occurrence of two cycles of Sphaerita endogena.

"H. L. Ratcliffe, has surveyed the members of the genus Phacus which occur in Georgia. In a paper on the cytology and binnary fission of Euglena spirogyra, he has verified in part the work done by Tschenzoff (1916), on Euglena viridis.

"H. P. Sturdivant, has made clear the spermatogenesis of the Anopheles mosquitoes, and is now working on the occurrence of a polyploid condition of its chromosomes.

"The anatomy of the embryonic germ cells of the chick and of the pig has provided a subject for J. C. Throughman to work out.

"E. Van Buren, suggests the possibility of a centriole occurring within the endosome or, "Binnenkorper" of Heteronema globiferum."

Neither is it left to their active members alone to carry on research. The faculty are naturally engaged in many forms of research and thereby encourage and direct the projects of the younger men.

In their monthly meetings such papers as for example those mentioned above are regularly read by the active members and discussed.

Reports on current articles in the various scientific journals are given for the benefit of all members each week outside the meeting hours.

The chapter boasts of a chapter enrollment of fourteen members, eight of which spent the summer last year at the Emory Biological Laboratory, to continue with their respective problems. What a fine record for a hot summer in the south!

SIGMA

A Short History of the Local Biological Club at Gainesville

By Marston Bates

THE club which was later named Beta Omega held its first regular meeting on May 7, 1924. The men who were present at this time included Alexander, Copeland, Dann, Johnson, Layman, Walker, and Wiig. The customary struggles and changes through which embryonic societies go were passed. Meetings were held regularly through the year 1924-25; new members were added, and the club carried on its business of life in the discussion of biology.

A petition to the national honorary biological society, Phi Sigma was sent in towards the last of the 1924-25 year. This year when we had our first meeting we learned that our petition to their chapters had been graciously received. The meetings which we have had so far have been successes in so far as they have accomplished much to encourage both friendly and scientific discourse.

We were initiated into Phi Sigma as Sigma Chapter on the afternoon of December 4, 1925.

As to work accomplished: that has mostly been an individual matter; the society as a group has discussed the investigation of the fauna and flora of our little Biological Station, and some work has been done by the separate members.

RHO

Activities are Centered Upon Investigations

By W. R. Tasher

RHO Chapter of Phi Sigma was installed March 28, 1925 with twenty-eight active members. Since that time very interesting monthly meetings have been held at which papers were presented by members on their research. Such presentations were followed by an open discussion of the topic under consideration and this affords a splendid opportunity for becoming acquainted

with the different phases of biological work being carried on by members of the chapter.

On December fifteenth the following members were initiated: W. C. Croxton, Graduate Assistant in Botany; K. F. Auden, Graduate Assistant in Entomology; S. W. Decker, Graduate Assistant in Floriculture; C. H. Oathout, Graduate Student in Agronomy; O. H. Sears, Assistant Professor of Soil Biology; Maude Williams, Graduate Assistant in Physiology; and W. M. Luce, Research Assistant in Zoology. After the initiation banquet Dr. Charles F. Hottes, Professor of Plant Physiology, gave a very interesting account of his experiences while a graduate student at the University of Bonn, in Prussia.

Rho Chapter has enjoyed a series of very entertaining and instructive lectures the past year. Miss Bessie Henry gave a very interesting account of her research work on "The effects of temperature and pre-soaking of seeds". Mr. H. W. Alberts, a member of Zeta Chapter, lectured to us on "The moisture relations of the corn kernel" and discussed their practical applications. Dr. Charles F. Hottes, Professor of Plant Physiology, delivered the address at the December initiation of new members, giving us an account of his personal experiences in the educational institutions of Germany at the beginning of the 20th century, and compared them with the American institutions of learning. A month later Dr. W. B. McDougall, of the department of botany, related to us his travels in the west during the summer of 1925 when he studied the ecology of mycorrhizas. Recently Mr. G. E. King enlightened us with an illustrated lecture on the honey bee and its structures of adaptation.

Although Rho Chapter is now just one year old a number of our members have taken unto themselves the title of "alumni". Mr. J. H. E. Clark has returned to South Africa and is engaged in agricultural instruction work; Mary Milligan is teaching nature study in the State Normal School at Fredericksburg, Va.; Cornelia Ossewaarde is teaching biology in the high school of Sioux Falls, S. Dakota; Eve Daniels is employed as botanist in the Illinois Natural History Survey, Urbana, Ill.; Prentiss Reid is teaching botany in Austin College, Sherman, Texas; Dr. Howard Abbott is head of the department of botany at the University of South Dakota; F. C. Nelson is with the Crop Protection Institute in New Jersey; and J. H. E. Clark is doing government work in Durban, South Africa.

The Grist in the Mill

The members in Rho Chapter are in the process of "grinding out" a large amount of research work. The names of the members and the nature of the topics being investigated are as follows:

BOTANY

Laura Schroeder, The comparative ecological anatomy in the genus Quercus.
Bessie Henry, The effect of temperature and pre-soaking on seeds.
Winona Welch, The Peperomias of Peru, South America.
Maurie Bailey, The genus Peperomia in northeastern South America.
Orton K. Stark, The amino-acids in soybeans.

Wilhelm Solheim, A taxonomic study of some Moniliales.
W. C. Croxton, Revegetation of coal stripped lands.

ZOOLOGY:
Morris Steggerda, The relation of Domestic fowls to climate.
The effect of ovarian stimulation on egg production in the domestic fowl.
W. M. Luce, The nature of infrabar.
The relation of jack rabbits to natural vegetation and to climate.

BACTERIOLOGY:
E. D. Devereux, Studies on Bios.
G. I. Wallace, Studies on the Bios question.
L. A. Black, Thermophilic bacteria from human and animal excrement.

AGRONOMY:
H. K. Wilson, Factors affecting germination.
C. H. Oathout, Soybean storage and other soybean problems.
O. H. Sears, The relation of the nitrogen cycle to the response of crops to potash treatment in Illinois.
W. R. Tascher, The metabolism of horny and starchy corn grains.
F. L. Winter, Studies on the Illinois chemical strains of corn.
N. A. Pettinger, Factors affecting the ratios of straw to grain and stover to grain.

ENTOMOLOGY:
M. R. Smith, Ants of a typical middle-western city with special reference to the house infesting species.
R. M. DeCoursey, Studies on the biology of *Pollerica rudis* Fabr., cluster fly.
G. E. King, A study of the principal glands of a honey bee with special reference to the production of brood food.

FLORICULTURE:
S. W. Decker, Catalase in relation to dormancy of Gladioli corms.

Candidates for Degrees

Laura Schroeder, botany; Maurie Bailey, botany; and F. C. Nelson, entomology; will receive their master's degree in June, 1926; and Orton K. Stark, botany, the degree of Doctor of Philosophy.

DELTA

True Nature Loving Scientists

By Doris F. Twitchell

Out to the Open

With the coming of spring one is glad to be a biologist; insects crawl out from hibernation and buds open to a warming sun. One likes to greet these seasonal comers as old acquaintances. Yet, only a short walk in the woods brings the average laboratory worker into a world strange to him, a biologist. Delta chapter recognizes this ignorance of field life among most of its members and is planning that one of its meetings be devoted to introducing the chapter to Hymenops, Orthops, and to Monocots and Dicots in their natural habitats. On May 23, the chapter will motor forty-seven miles to the University of Maine Biological Station at Bar Harbor. There in Lafayette National Park we shall enjoy field trips conducted by those workers whose specialization has kept them close to out-of-door life.

Make Friends With the Math Department

Another need of its members which the chapter is meeting this year is that "mathematical need" for biologists are not always mathematicians. A lecture by Prof. Bryan, of the Mathematics Department, changed Fisher's book on statistics from a closed book of unintelligible formulae, to an open book of valuable suggestions for our use with experimental data. This is

the beginning of what we hope will be a closer relation between the two departments of Mathematics and Biology.

Two Speakers in One Evening

A third need, one which every member experiences, is that of planning a program which economizes time. This year's program of Delta chapter has included several supper meetings which give opportunity during the meal for socializing among workers in kindred subjects and which give time after the meal for two speakers and discussion.

Recreation

We don't forget to play at Maine. At the Christmas banquet served in the "wasp lab.", Santa Claus actually came down through the roof and distributed joke presents. The initiates responded to their gifts with impromptu stunts. Which of these cards would have marked your plate?

Arbacia is my name,
Spiny is my skin,
But I am known to fame,
I have *Fertilizin*.

Oh Chromosomes, Oh Chromosomes,
What burdens thou dost carry,
Oh Chromosomes, Oh Chromosomes,
My life you surely harry.
The first one stains as black as ink,
The next one fades to a pale pink,
I'd like to throw them in the sink
And here no longer tarry.

The summer sun was sinking fast,
Aphidae, Aphida,
When through the potato patch there passed,
Aphidae, ada.
A lady, small and wise and neat,
Aphidae, Aphida,
A chasing aphids green and pink,
Aphidae, ada.

This is the cow with the swell relations,
That furnished the data and variations,
And computations and correlations,
That went in the book that Jack built.

Lorinda Orne
Studied corn
And counted flies
With purple eyes,
To see if factors Mendelize.

We used skis and snowshoes, cameras, and hot coffee and broiled steak on the hike to Piny Knoll. When are renowned researchers and young students on common ground? When head first in a snowbank!

BETA

Increases Initiation Fees

By C. Francis Byers

DURING the current year Beta Chapter has been holding on an average two meetings a month. The meetings at which the faculty members addressed us have been of unusual interest and profit. Among the outstanding talks were those given by Dr. Carl E. Guthe on, "The Philosophy of a Scientist"; by Dr. M. H. Soule on, "Some Aspects of The Canning Industry"; and by Dr. W. B. Hinsdale on, "The Inland Waterways of Michigan." The social meetings of the society have been practically limited to these lectures and to random discussions of Biological problems by the members.

At the business meetings several important matters were discussed, some of them ending in definite conclusions, while others were not so fortunate. One meeting was given

over to the consideration of the convention, and Mr. Erlanson, Beta's delegate, presided. This was one of the matters that was unfortunate enough to excite no definite action or opinion. Mr. Carl Huber was appointed by the president to edit an article featuring Beta Chapter in The Biologist. A committee was appointed by the president to determine the research facilities of the University, as asked for by Dr. Reed. In an endeavor to relieve the protracted financial embarrassment of the treasury, due to the increasing demands placed upon it, both by national and local business, the initiation fee was increased from $15 to $20 (including key).

At the fall initiation eight active members were added to the chapter and at the spring initiation to be held in May, eleven will join our ranks. The officers for the coming year were elected March 17; they are:

President ..... A. F. Roe
Vice-President ..... Carl Huber
Secretary.....C. Francis Byers
Treasurer.....Paul A. Moody

XI

Nebraskans Swinging a Big Program

Group Discussions, Field-trips, and Research are Mentioned

By Florence Tucker

XI Chapter has more or less confined itself to three rather definite lines of endeavor during the present school year. The first, is an attempt to increase the value or helpfulness of the bi-monthly meetings of the chapter. These meetings constitute the main activity of the chapter and an effort has been made to better them in the following three ways: (a) By securing speakers and papers of as much interest as possible. Dr. R. J. Pool, chairman of the department of botany, was secured as the speaker for the first meeting of the year. He spoke of his trip to Norway and Sweden during the summer of 1925 and described the country as it appears to a biologist. The opening meeting, then, was very interesting and created much enthusiasm. (b) By inducing those who attend the meetings to ask questions and enter into discussion when the meeting is thrown open. To give special emphasis to this a meeting was held at the home of Dr. Paul B. Sears. Each member was asked to come prepared to give a brief account of his research activities, to tell why he was doing it, and why he liked it. The University rule as to closing hour for week-night meetings was almost forgotten that evening. Fifteen members or more were on hand with reports. And each seemed to have mentioned a method used, a result obtained or some other detail that drew questions and discussion from all. (c) By drawing on members interested in widely different phases of biology for papers. In line with this a sort of field trip was taken one evening out to the Plant Pathology greenhouses. Much experimen-

tal work was in progress in these greenhouses and the big lights, refrigeration plant and other controls were in full operation. It gave the pre-medics a chance to see something of the plant pathologist's work.

The second line of endeavor took the form this year of inviting a well known zoologist from another institution to come and deliver a lecture at a public meeting of the chapter. Dr. James E. Ackert, parasitologist in the Kansas Agricultural Experiment Station and Dean of the Graduate School of the Kansas Agricultural College, was kind enough to consent to come and deliver an address on "Recent Advances in Medical Zoology". The meeting was well advertised and an effort made to invite all people who might be interested. The result was a large and appreciative audience. Incidently a lot of advertising for Phi Sigma. The society rates considerably higher at this institution since that occasion.

That the chapter members are interested in, and are doing, research work was quite evident at the April 14, 1926, meeting of the chapter. The chapter editor asked for a statement from each member present as to the nature of the research work he was interested in or engaged in. Eighteen, all that were present, responded. Interest in research has been furthered by the fact that such interest, as well as ability to do research, is one of the primary qualifications for membership in Xi chapter.

An Example of Research Work Done by Xi Chapter Members

(This is a verbatim copy of one of the eighteen reports handed to the chapter editor and is quite typical. Mr. Herzog is a candidate for a bachelor's degree in June 1926).

Ligula of Potter, Nebraska

By Geo. A. Herzog

The Ligula, a cestode parasitic in fish, is found in many places, both in the Americas and in Europe. My study of it has been confined to the lakes in western Nebraska, especially in the vicinity of Potter. My specimens were sent to Dr. Barker at the University by Dr. Sloan, a physician and sportsman of Potter, for identification and a remedy for the infected fish.

The specimens were readily identified as some species of Ligula and are probably **Ligula catastoma** for they were found parasitic in suckers similar to some found by David S. Jordan in Yellowstone National Park lakes. These were infected with Ligula which he classified as **Ligula catastoma.**

Xi Chapter Items

Xi chapter started the present school year with an active membership of thirteen. The addition of fourteen new initiates during the year brings this to twenty-seven. Attendance at meetings runs from fifteen to twenty. The meetings have been held mostly for the purpose of hearing addresses of papers. A minimum of time has been taken up in meetings this year in discussing routine business matters. The social programs have consisted of dinners

followed by speaking, or social gatherings with refreshments and discussion.

Research is being done by the various members in the following fields: Morphology (botany), Parisitology, Physiology and Ecology (botany), Arachnology and Ornithology. A large number of the members are doing research in parisitology under the direction of Dr. F. D. Barker. The majority of those engaged in research are working on problems on which they will base theses for master's degrees.

L. G. Worley and O. L. Williams are working jointly, on the spiders of Nebraska and on bird migration studies in the vicinity of Lincoln. They are having some difficulties with their spiders for many of them are apparently new to science. One new bird has been added to the list for Nebraska.

J. A. Cameron will present a paper on, "Regeneration in **Scutigera forceps**" before the Nebraska Academy of Science, April 30, 1926.

Chas. R. Gienger was awarded Phi Beta Kappa honors this semester.

The following are the Xi chapter officers for the following year:

President ..... Leonard G. Worley
V. Pres. and Editor...Rayburn W. Samson
Secretary ..... Ruth R. Meyer
Treasurer ..... Owen L. Williams

Dr. James E. Ackert's address on March 17, before a meeting of the society, to which the general public was invited, received much favorable comment. Xi chapter feels quite highly honored in having Dr. Ackert address the chapter.

OMICRON

Outline Shows Interesting Activities

By Edwin A. Fluevog

Alumni News

DR. R. T. Young, formerly faculty advisor of Omicron Chapter, Phi Sigma, is a member of the Biology Department, University of Montana.

Capt. R. E. Fugelstad, B.S. of the University of North Dakota is head of the biological department, Lexington Military Academy, Lexington, Missouri. During the past summer in the interests of research he made a trip through South America and a number of the islands along the coast.

Rudolph Kouchy, B.S. of the University of North Dakota ('24), is instructor in anatomy at the University of North Dakota. Besides being a member of Phi Sigma, he was also elected to Phi Beta Kappa and to active membership in Sigma Xi.

Helen Stegenda, B.S. of the University of North Dakota ('24), is now a member of the staff at the Biological Museum at Chicago, Ill.

Chapter Activities

Meetings: 10 meetings.
Average attendance, 92%.
Faculty, 4 members.

Nature of meetings:
Three strictly scientific meetings.
Three special meetings.
Two initiation meetings and banquets.

Farewell banquet in honor of Dr. R. T. Young.

Report on Scopes Evolution Trial.

Research among members:

Recent publication:

Dr. R. T. Young, Biology in America, Life in Devils Lake.

Mr. Kouchy, Intervenus injection of mercurichrome.

Mr. Finkle, Physiological significance of fatigue as by analysis of sweat and urine.

Digest of research in progress:

Mr. Tyvand, Physiological changes brought about in blood as related to Urine and Sweat.

Mr. Fluevog, Effect of alcohol on nervous tissue.

Mr. Shunk, Study of bird thyroids.

Mr. Baird, Botany.

Miss Tracy, Effects of a non-calcium diet.

Candidates for degrees:

Masters:

Monte P. Shunk, Ralph Finkle.

Bachelor:

Monte P. Shunk, Wilfred Lowe, Raymond Tyvand, Oliver Abbott, Edward Dorr, Edwin A. Fluevog, Maude Chase, Roy Bach, Reinhold Goehl, Melvin Hetland, Glenn Toomey, Helen Tracy.

Active members, 20.

Active members engaged in research, 6.

Active members who have published manuscripts.

Plan followed in obtaining new members:

Scholarship and research.

Keeping in touch with alumni through periodic letters.

Scholastic rating, high.

IOTA

Woods Hole Scholarship, Awarded to Oliver McCoy, Senior Zoologist

By Charlotte Dawley

IOTA Chapter is having a very successful year. We feel that our meetings are well attended and that there is an increasing number who show an active interest. The greater number of members are graduate students who are either engaged in research at the present time or are intending to do so. There is also a large number of faculty members who, we feel, are a very important factor in our membership, in the inspiration they give by their friendship and encouragement. We have but two undergraduates. There is a question as to whether we should invite more to membership.

At our April meeting the members elected this spring were initiated. There were six: Martha Beardsley, Mildred Mathias, and Mark L'Hommedieu from the Missouri Botanical Gardens, Frances Haven, Paul Preisler, and Wm. F. Ossenfort from the Medical School. This brings the total number of new members taken in this year up to twenty-three.

At the March meeting the following officers were elected:

President ..... Sam Clark
Vice-president ..... George Seib
Secretary ..... Charlotte Dawley
Treasurer ..... Oliver McCoy

The most important activity of the chapter as a whole during the year is the earning of seventy-five dollars for a scholarship for a student (graduate or undergraduate, and not necessarily a member of Phi Sigma) who wishes to go to Woods Hole or Friday Harbor or some other summer biological station. This scholarship has been given for the past two years, and there is a great deal of pleasure in giving it. The money was earned this year and last by selling tickets for a benefit performance at one of the moving picture theatres in St. Louis. This has proved the most profitable method and requires a comparatively short time. The scholarship has just been awarded for this year to Oliver McCoy, a senior in the Zoology Department and one of the two undergraduate members of Iota Chapter. Mr. McCoy plans to spend the scholarship at Woods Hole this summer, and to return to the department to do graduate work next year.

At our meetings, we have two reports of research, which may be on research being done at the present time, or on subjects of general interest. These have been very interesting, and so far, have been the only means by which members from one department know what those in other departments are doing.

To do away with this lack of acquaintance with each other's work, we have sent out a questionnaire asking each member to give a statement of the research they are doing at the present time. The following list shows an interesting variety of subjects in research which are being carried on at the present time by members of Iota Chapter.

Dr. Edgar Anderson—Geographical variation in Iris.

Dr. B. M. Duggar—The Physico-chemical behavior of the tobacco mosaic. The filtration relations of certain species of bacteria. The influence of the juices of various plants upon the infectivity of the tobacco mosaic virus.

Dr. Theodore Friedemann—The rate and products of oxidation of various sugars by hydrogen peroxide in alkaline solution. The rate of production of acids, particularly lactic acid, when alkali alone acts on sugars. The reaction of the sugars and aldehydes listed above with acetoacetic acid. The effect of the various sugars upon relieving the symptoms of insulin coma in rats and rabbit. The metabolism of acetoacetic acid in dogs and the effect of insulin on its rate of oxidation when sodium acetoacetata is injected intravenously at a constant rate. Experiments were made on normal starved and phlorhizinized dogs, Glycuronic acid formation in the rabbit and the effect of the plane of carbohydrate metabolism. This work has been carried on with Dr. Shaffer and other members of the department of biological chemistry.

Dr. Jesse More Greenman—Monograph of the North and Central American Species of the Genus Senecio—Part II (published in part). Studies in South American Senecios. Synoptical Revision of the West Indian Senecios. Botanical Expedition to Central America. New or noteworthy plants of Columbia. Flora of the Southwestern United States.

Dr. Edward West—Condensation products of acetoacetic ester and their relationship to antiketogenesis both in vitro and in vivo.

Dr. Stephen W. Ranson—Part played by the dorsal and spinal ganglia in muscle tonus. Relation of the sympathetic nervous system to muscle tonus. Decerebrate rigidity. Tetanus.

Dr. Ethyl Ronzoni—Metabolism in relation to obesity. Formation and disposal of lactic acid in the body. Metabolism of cancer tissue.

Dr. Clifford H. Farr—Studies on cytokinesis, and cell enlargement, including the effects of various salts on the elongation of root hairs.

Dr. H. Lester White—Kidney function in Necturus. Circulation, secretion of kidney.

Dr. Margaret Upton—Flora of duodenum.

Dr. Robert J. Terry—Significance of the supracondyloid variation; inverse symmetry; variation in colored races; fluid content of the pulmonary alveolus.

Dorothy M. Anderson—Correlation of numbers of chromosomes in Iris with external species characters. Petunia—genetics of a white spotted character.

Adam N. Boyd—Histological changes in the fallopian tube of the Opossum during the phases of the oestrous cycle.

Sam L. Clark—A classification of the primary afferent neurones of the dog according to the arrangement of their Nissl granules.

Zola Cooper—Study of the effects of alcohol on the intelligence of the albino rat.

Laliah Curry—Study of the cytology of the kidney tubule of Nectrus and Diemyctilus.

Henry H. Dixon—Method for staining neurological tissues (electro-chemical).

Clarence E. Kobuski—Monograph of the genus Dyschoriste.

Alfred M. Lucas—Embryology and variation in development of the Molgulidae.

David C. Neal—A physiological study of cotton wilt and the relationship of fertilizer combinations to its development.

J. Paul Reeves—Relative food value of the cotyledon.

Horace R. Skinner—New Method of osteological preparation. Removal of carbolic acid from skeleton and cleaning by bacterial enzymes.

Philip Varney—The serological types of Bacillus Fusiformis.

Robert Woodson—The formation of elementary conductive system in the radicles of Nelumbo lutea.

Emery R. Ranker—Determination of nitrates and total nitrogen in physiological solutions and extracts.

Fanny Fern Smith—Pseudo-fertility in Nicotiana. Cytological studies of mosaics and leaf variegations in plants.

Everett F. Davis—Nature and transmission of infectious chlorosis in variegated plants.

Elva P. Miller—Some phases of the nutrient relations of cellulose destroying bacteria.

ZETA

Public Lecture by Dr. A. H. Reginald Buller is Fostered by the Chapter

By M. B. Linford

ZETA Chapter has been enjoying an exceptionally good series of meetings this semester and incidentally is thereby becoming better known on the campus. The outstanding event of the semester thus far was the public lecture on a popular biological subject which was sponsored by the chapter. This was a lecture on *"Carnivorous Plants"* by Dr. A. H. Reginald Buller, Professor of Botany in the University of Manitoba. The chapter cooperated with the departments of Plant Pathology in bringing Dr. Buller to the University, and while here he spoke in these depart-

ments on more technical subjects. Dr. Buller is widely known for his notable researches on spore production and discharge in the fungi; and next to the fungi he has been interested in the insectivorous plants. His discussion of this subject, profusely illustrated with lantern slides and with examples drawn from his own observations and the work of Darwin, provided a most pleasing and enlightening evening's entertainment. While here Dr. Buller was guest of the chapter officers at luncheon, and he expressed his great pleasure in the reception accorded him.

An evening's program that was drawn very effectively from home talent was given by Mr. Granovsky of Agricultural Entomology and Mr. Anderson of Agricultural Bacteriology. Mr. Anderson who has but recently returned to complete work for a Ph.D. after spending two years in Sweden spoke concerning facilities for research and other things of interest in that country. Dr. Granovsky, an active member of the chapter until this year and now on the staff of Economic Entomology, told us of his studies of feeding habits and control of grasshoppers. Mr. Granovsky has met with remarkable success in the control or almost eradication of grasshoppers on the Door County Peninsula, winning the name of St. Patrick of Door County. His illustrated talk was most entertaining and instructive.

Three very successful open meetings have been held recently with the speakers chosen from members of the faculty who are outstanding in their fields, selected by ballot of the chapter membership as described in the last issue of *The Biologist*. These meetings have been open to prospective members of the chapter and to two of them special invitation was extended to the members of Gamma Alpha, Sigma Delta Epsilon, and Rho Chi. The speakers and their subjects were: Professor Loevenhart, on Biological oxidations, with special reference to human physiology; Professor Twenhofel on Paleontology; and Professor Dawson on the History of dissection of the human body. Each of these talks, with the discussion which followed, was a valuable contribution to the knowledge of those present; and the unusual attendance attests the merit of this means of choosing speakers.

Luncheon at Five-thirty P. M.

Kappa chapter activities consist of a regular meeting every two weeks. These meetings are called at five-thirty P.M. At that time luncheon is served and following this there is very often a talk by some member of the faculty or student-body representing a field in biology. Following the discussion of the papers read a business meeting is called. Every spring after the initiation ceremony the society gives a banquet for all its members.

Looks Betrayed Him

Cop: "You're under arrest."
Cross-eyed: "What for?"
Cop: "You look crooked."
—*Denver Parrakeet.*

THE BIOLOGIST

VOL. VIII MAY, 1926 No. 1

The Present Status of the Female Sex Hormone

H. M. KRUEGER

(Abstract of paper read at Kansas City Convention)

There is elaborated by the ovaries a specific female sex hormone which is used to condition the growth of Mueller's tract and of the mammary glands. In the laboratory the presence of this hormone may be detected by the production of growth in the uterus, vagina and breasts of immature or castrated rabbits; or by studying the change in cell types appearing in smears of the vagina of castrated rats. (The cell type changes from leucocytes to squamous epithelium).

This hormone has been detected in the follicle fluid of the ovaries, the corpora lutea of the ovaries and also in the placenta. It has also been found in the blood of animals in estrous. It has not been found in the blood of males, nor as yet in anestrous females. It has not been detected in any such lipoid bearing bodies as the testes, thymus or other glands. So far the physiological properties of this hormone have not been produced by any lipoid found in the laboratory, or elaborated from other sources than those given above.

The active substance is a liquid thermostable lipoid of high molecular weight. It is soluble in all lipoid solvents. It is insoluble in, but may be emulsified in, water. It contains only carbon, hydrogen, and oxygen. It does not contain cholesterol or substances giving the cholesterol reaction. It is not an ester or a fatty acid. It probably does not contain an OH or a C:O group.

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The Odonata of Michigan

C. Francis Byers

Entomologists interested in the fauna of Michigan have long felt the need of a catalogue of the Odonata of the State. R. A. Muttkowski has worked out the Dragonflies of Wisconsin; E. B. Williamson, the Dragonflies of Indiana; D. S. Kellecott, the Odonata of Ohio; Philip Garman, The Zygoptera of Illinois; J. G. Needham has published on the group for New York State; P. P. Calvert, for Pennsylvania; and E. M. Walker has been writing on Canadian Odonata for years. So Michigan stands, virtually, an island of unworked territory in a region over which diligent collecting has been carried on for years.

It is the purpose of the author to publish a catalogue of the Odonata of Michigan sometime in the near future. A step has already been taken in this direction by the publication of, "Odonata Collected in Cheboygan and Emmet Counties, Michigan", to appear in "The Papers of the Michigan Academy of Science, Arts, and Letters", for 1925.

The author would be glad to correspond with any person having records of Michigan Odonata, or determine collections of Michigan Odonata for the privilege of retaining a series of duplicates. Credit will be given in the publication to all persons concerned.

Reptilian Fowls—A Study in Atavistic Heredity

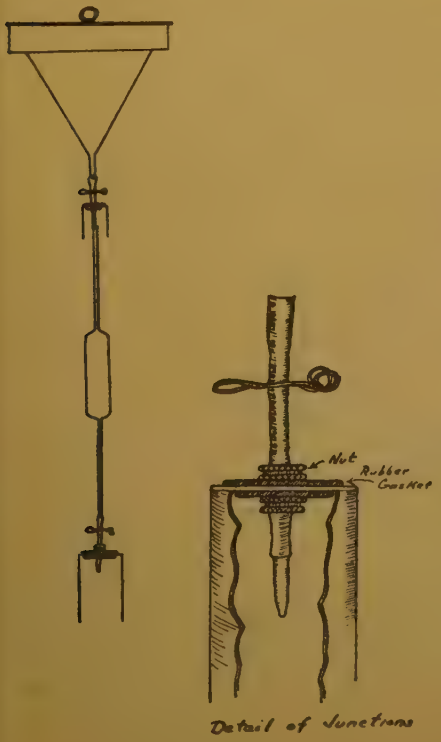
Ira Eugene Cutler

The peculiar variety of fowls in question, Creepers, Dumfries or Brevecrews, has been known for hundreds of years, along with the Rumpless, Frizzles, silkies and the like, but no one seems to have noticed the peculiarities which are the specific topics of this paper. These abnormalities lie in the appendages, the wings and legs. In both cases the bones are all much shortened; but in the leg, in addition to the shortening of the bones, we find in the orus, or "drumstick", two complete bones. In normal fowls there is one bone, the tibia, with a small splint, the fibula. In old specimens these members are strongly ankylosed, especially in the distal portion. In the unequal lengthening of these the tibia becomes bent forward and thickened. This complete development of the fibula is surely of low reptilian type. Genetically, when these fowls are crossed with normal ones, about fifty per cent will come true to type. When bred interse, some chicks show this abnormality, making walking absolutely impossible. Here we have a lacertilian, rather than a dinosaurian characteristic. It is commonly held that birds sprang from a reptilian stem, probably as an offshoot of the dinosaurs. These facts may throw some light on this problem.

A Simple Device For Delivering Accurate Amounts of Sterile Water

By John H. Highberger and George E. Rockwell, Cincinnati, Ohio

During the course of work involving a large number of bacterial counts, a rapid, simple and accurate method was sought for filling dilution bottles with the required amount of sterile water. After trying several methods, the device shown in the figure was finally evolved.



The apparatus consists essentially of two parts, which are wrapped separately and sterilized. The first part is the water reservoir, which is a large funnel of two-liter capacity fitted with a lid with a deep, overhanging flange. The funnel may be of metal or of Pyrex glass. A rubber tubing provided with a pinchcock connects the funnel to the tip which delivers into the pipette. The tip is enclosed in a glass cylinder, open at the bottom, and fitted to the tubing with rubber gaskets. This cylinder, which is conveniently made from a small Berkefeld mantle, serves as a shield to protect the junction of the tip and the pipette from contamination.

The pipette is of Pyrex glass, and is graduated, as shown, to deliver either 90 or 99 cc. The stem of the pipette should have an inside diameter of at least 8 mm. to permit easy filling of the bulb without danger of overflow from back pressure

of air. The tip at the bottom of the pipette is the same as that on the funnel, with the substitution of a cylinder large enough to admit the bottle being filled.

The advantages of this apparatus are: speed, simplicity and accuracy. A careful and fairly skillful worker can fill about eighty bottles in an hour, without danger of contamination. The coefficient of thermal expansion of Pyrex glass is very low, so that, if the pipette is allowed to cool to room temperature after sterilizing, the error from this source is negligible. Finally, there is nothing about the apparatus to get out of order, and all that is required to obtain good results are care in use and infrequent renewals of the rubber connections.

By Courtesy, THE REAGENT NEWS, November 1925
The Coleman & Bell Co.

THE GRIST WE GRIND

WASHINGTON U. (IOTA)

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PHI SIGMA

FELLOWS IN A.A.A.S. TOTALS 150

List as checked in Oct. 1925 in Permanent Secretary's office

ALPHA, 5—Barrows, W. M.; Mote, Don C.; Sears, Paul B.; Waller, A. E.; Reed, C. I.

BETA, 28—Bartlett, H. H.; Blanchard, M. N.; Bonar, Lee; Case, E. C.; Davis, B. M.; Dice, L. R.; Ehlers, J. H.; Gates, F. C.; Glaser, O. C.; Hadley, P. B.; Heilbrunn, L. V.; Hoadley, Leigh; Hubbs, C. L.; Huber, Ernest; Klaaphaak, P. J.; La Rue, G. R.; La Rue, C. D.; Lewis, H. B.; Maranon, J. M.; Novy, F. O.; Novy, F. G.; Okkelberg, Peter; Senstius, Maurice; Stoll, N. R.; Tucker, D. V.; Warren, P. A.; Welch, P. S; Wenley, R. M.

DELTA, 7—Boring, Alice M.; Craig, Wallace; Chrysler, Minton Asbury; Eyster, William H.; Gonser, Harry Newton; Patch, Edith Marion; Whiting, Phineas Wescott.

EPSILON, 3—Garth, Thomas Russel; Munz, Phillip; Wilson, Carl Louis.

ZETA, 35—Armstrong, George Miller; Bennett, James Percy; Birge, Edward Asabel; Bryan, George Smith; Clevenger, Clinton B.; Fellows, Harley; Frey, Charles N.; Gardner, Max William; Gibbs, William Merriott; Giddings, N. J.; Gilbert, Edward M.; Godfrey, George Harold; Hall, Frank Gregory; Hubert, Ernest E.; Jones, Leon Kilby; Jones, Lewis Ralph; Kraus, Ezra Jacob; Link, Carl Paul; Lush, Jay Clarence; Murneek, Andrew E.; Nelson, Thurlow Christian; Pearse, Arthur Sperry; Reinking, Otto August; Rickett, Harold William; Riker, Albert Joyce; Roberts, Ray Harland; Snell, Walter Henry; Tisdale, Wendell Holmes; Tisdale, William Burley; Toole, Eben Henry; Waddell, James; Walker, John Charles; Weber, George F.; Weed, Alfred; Woodworth, Clyde Melvin.

ETA, 0—

THETA, 3—Bessey, Ernst; Athearn, Giltner, Ward; Hunt, Harrison Randall.

IOTA, 14—Allen, Edgar; Danforth, Charles H.; Duggar, Benjamin M.; Geiser, Sam W.; Grant, Adele Lewis; Grave, Caswell; Greenman, Jesse More; Hanson, Frank B.; Miller, Harry M.; Payson, Edwin B.; Ranson, Stephen W.; Shaffer, Philip A.; Visscher, Paul; Young, Harry C.

KAPPA, 8—Allen, B. M.; Baumgartner, W. J.; Hungerford, H. B.; Lane, H. H.; Mix, Arthur Jackson; Stevens, W. C.; Stoland, O. O.; Wheeler, Ruth.

LAMBDA, 4—Brannon, Melvin A.; Elrod, Morton J.; Graff, P. W.; Kirkwood, J. E.

MU, 21—Bennett, J. P.; Bryant, Harold C.; Burnett, T. C.; Esseg, E. O.; Evermann, B. W.; Goodspeed, T. H.; Grinnell, Joseph; Holmes, S. J.; Horne, William T.; Jordan, David Starr; Kofoid, Charles A.; Lipman, Charles B.; Meyer, K. T.; Miller, Robert C.; Moody, Robert O.; Packard, Clyde M.; Parish, S. B.; Setchell, W. A.; Smith, Ralph E.; Van Dyke, Edwin C.; Woodworth, Charles W.

NU, 8—Davenport, Charles B.; Graves, Arthur H.; Grier, Norman MacDowell; Harshberger, John W.; Jennings, Otto Emery; Linton, Edwin; Ortmann, Arnold Edward; Pinchot, Gifford.

OMICRON, 1—Young, Robert T.

XI, 8—Barker, Franklin D.; Latimer, Homer B.; Peltier, George Leo; Pool, Raymond John; Waite, Herbert; Weaver, John Ernest; Whitney, David D.; Wolcott, Robert Henry.

PI, 2—Bachmann, Jean George; Rhodes, Robert Clinton.

RHO, 3—Abbott, Howard C.; Van Cleave, Hartley, Jones; Tanner, Fred Wilbur.

153 members in A.A.A.S.

REPORT OF THE NATIONAL TREASURER

June 1, 1925 to January 1, 1926

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Receipts	$512.45
Expenditures	223.01
Balance on hand	289.44

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Expenditures	903.60
Deficit	200.44

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